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ENVIRONMENTAL IMPACT STATEMENT

BOGOTA WATERSHED

DYER AND OBION COUNTIES,

TENNESSEE



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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Bogota Watershed
Dyer and Obion Counties, Tennessee

FINAL ENVIRONMENTAL IMPACT STATEMENT

Paul M. Howard, State Conservationist
Soil Conservation Service

Sponsoring Local Organizations

Bogota Drainage District, Dyer County Courthouse
Dyersburg, Tennessee 38024

Dyer County Soil Conservation District
Federal Building
Dyersburg, Tennessee 38024

Obion County Soil Conservation District
Blanton Building
Union City, Tennessee 38261

February 1975

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Prepared by
United States Department of Agriculture
Soil Conservation Service
Nashville, Tennessee 37203

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USDA ENVIRONMENTAL IMPACT STATEMENT
Bogota Watershed Project
Dyer and Obion Counties, Tennessee
Prepared in Accordance with
Sec. 102(2)(C) of P.L. 91-190

Summary Sheet

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. Description of Project Purpose and Action: This project is for watershed protection and flood prevention in the 11,500-acre Bogota Watershed which encompasses the drainage area of Daugherty Creek, located in Dyer and Obion Counties, Tennessee. Action called for includes conservation measures on 5,910 acres of land, and about 29.2 miles of stream channel work with appurtenant measures, construction of one grade stabilization structure, and mitigating measures. The channel work will involve 27.7 miles of excavation and enlargement plus 1.5 miles of clearing and debris removal on existing channels to reduce flooding in an area that is 84 percent agricultural cropland and grassland. All of the channel work involves manmade ditches or previously modified channel with ephemeral flow only.
- V. Summary of Environmental Impacts Including Favorable and Adverse Environmental Effects: Erosion rates for the uplands will be reduced by 60 percent-reductions are cropland 25 tons/acre/year; grassland 5.5 tons/acre/year; and forest land 1.5 tons/acre/year. Gross erosion will be reduced from 12,636 tons/year to 5,110 tons/year. Plant species diversity will be improved on 120 acres of forest land by adding conifers. Average annual suspended sediment concentration will be reduced from 143mg/l to 58 mg/l. Total sediment yield from the watershed will be reduced from 4,424 tons/year to 1,788 tons/year. Mosquito production will be reduced. Direct agricultural damages by flooding will be reduced by 73 percent, and indirect damages will be reduced by 23 percent. Duration of flooding will be reduced by 83 percent. Sediment traps in channel will materially reduce sediment load stemming from construction. Gross annual farm income per farm will be increased by about \$3,000 or about 35 percent. The 1,600 residents will be directly or indirectly benefited. One hundred fifty-four acres of wildlife food and cover will be established on the spoil and berm of the new channels. Six new jobs and sixty man-years of semi-skilled employment will be created. The incidental feeding areas of the southern bald eagle will be eliminated by the land smoothing. Sixty-one acres of trees and shrubs will be lost to channel construction.

Two hundred twenty-two acres of cropland and 10 acres of pasture will be lost temporarily to construction. Eighty-five acres of cropland will be lost permanently to construction. Minor increases in sediment load will occur during construction. Decline in visual quality will last until vegetation is reestablished. Reduction in air quality will be minor during construction.

VI. List of Alternatives Considered:

- A. Acceleration of conservation land treatment,
- B. Flood plain management,
- C. Floodwater-retarding structure,
- D. Channel work,
- E. No project.

VII. Agencies from which written comments were received:

Department of the Army

Department of Health, Education,
and Welfare

Department of the Interior

Department of Transportation

Environmental Protection Agency

Governor of Tennessee

Tennessee Office of Urban and Federal Affairs
(State Clearinghouse)

Advisory Council on Historic Preservation

Northwest Tennessee Development District

VIII. Draft statement transmitted to CEQ on August 7, 1974.

USDA SOIL CONSERVATION SERVICE
FINAL ENVIRONMENTAL IMPACT STATEMENT *
for Bogota Watershed
Dyer and Obion Counties, Tennessee

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83d Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

Bogota Drainage District, Dyer County Soil Conservation District, and Obion County Soil Conservation District.

PROJECT PURPOSES

Project purposes finalized by the sponsors are:

1. Reduce floodwater damages to the extent of minimizing crop and pasture losses,
2. Reduce upland erosion to acceptable level,
3. Utilize each acre of soil to the extent that it will not be used beyond its capability when controls of erosion and flooding are established,
4. Remove debris, vegetation and sediment from the major waterways and ditches and arrange for maintenance for the next 50 years to insure adequate flood control,
5. Application of needed on-farm water management measures,
6. Maintain wildlife habitat for small game species native to the area.

PLANNED PROJECT

Land Treatment Measures

Conservation land treatment measures which consists of land use changes and conservation practices will be carried out on two problem areas in the Bogota Watershed. These two areas of treatment consists of 910 acres of upland needing treatment for improved erosion and flood prevention control, and 5,000 acres of flood plain lands that need land treatment to maintain and improve productivity which will assure the realization of benefits used in project justification.

Land use and treatment in the upland problem area will include converting 150 acres of cropland to grassland or grassland-cropland rotations and the use of contour farming, minimum tillage, and grassed waterways. Other treatment will consist of improving the

*Unless otherwise stated, all data contained in this statement was developed by Soil Conservation Service and Forest Service.

cover conditions on 420 acres of grassland by the use of lime and fertilizer according to soil test, rotation grazing and weed control programs.

Forest land treatment measures will consist of reforestation on 120 acres of understocked stands and stand improvement measures on 220 acres to improve the hydrologic capabilities by adjusting the stand composition for optimal development and protection. Practices include, but are not limited to, improvement cutting, tree release, and cull removal.

A forest management program aimed at fulfilling watershed needs and objectives will be implemented. Forest lands will be managed to fulfill wildlife, recreation, timber, and other environmental functions to the extent that such management is compatible with sound watershed management.

Land treatment on 5,000 acres in the flood plain problem area will consist of 3,500 acres of land smoothing to remove irregularities on the surface of the flood plain for improved watershed management and production. Row arrangement, bedding, tile drains, drainage ditches and management of plant residues will enhance and assure the realization of benefits used in project justification.

Acceleration of technical assistance is planned for the orderly application of the land treatment measures. The Obion and Dyer County Soil Conservation Districts will continue to provide technical assistance with emphasis on complete resource conservation plans that emphasize the reduction of soil movement and rates of runoff. An estimated 45 conservation plans will be prepared during the 3-year installation period. These plans will represent a record of management decisions by landowners and will be the basis for timely installation of land treatment measures.

Land use planning and application of treatment practices will be in keeping with standards used in obtaining effective soil and water conservation as outlined in the Soil Conservation Service Technical Guides. (1) Technical assistance will be provided by the Tennessee Division of Forestry for an effective forestry management program.

Structural Measures

All structural measures will be installed within the boundary of the Bogota Drainage District. The Bogota Drainage District has legal authority to raise funds through assessments levied by the County Court and the power of eminent domain to acquire all land rights needed for the project measures for flood prevention. This authority will be used as needed for the orderly progress in installing the planned measures. The Bogota Drainage District will obtain all land rights, be responsible for all costs in acquiring the needed land rights, and local project administration costs. Bridges or culverts of adequate design will be replaced as agreed upon by the sponsoring local organization, the local branch of government responsible for the roads,

and the Soil Conservation Service. The sponsoring local organization will be responsible for the construction of these bridges. Each crossing will be replaced as that segment of channel excavation is completed.

After the detailed surveys and designs have been completed and prior to the signing of the project agreement, the Service and a representative of the sponsoring local organization will make an on-the-ground check to determine the adequacy of the acquired land rights, the arrangements for removal, relocation, or salvaging of buildings, roads, utilities, bridges, culverts, pipelines, and other improvements, and the relocation or reconstruction of fences. The sponsoring local organization must certify to the Soil Conservation Service that all necessary land rights have been acquired. A copy of each land rights instrument covered by the certification will be furnished the Soil Conservation Service.

The planned channel work will be on about 29.2 miles of previously modified or manmade channels as shown on the project map in Appendix C. These channels have ephemeral flow. This channel work includes about 27.7 miles of excavation and enlargement of existing channels as follows:

- a. About 38,400 feet on main Daugherty Creek,
- b. About 8,200 feet on Lateral 1,
- c. About 8,800 feet on Lateral 3,
- d. About 14,900 feet on Lateral 4,
- e. About 4,600 feet on Lateral 5,
- f. About 10,300 feet on Lateral 6,
- g. About 24,500 feet on Lateral 7,
- h. About 5,000 feet on Lateral 8,
- i. About 3,300 feet on Lateral 9,
- j. About 2,800 feet on Lateral 10,
- k. About 5,300 feet on Lateral 11,
- l. About 1,800 feet on Lateral 12,
- m. About 2,400 feet on Lateral 13, and
- n. About 32 improved inlets based on 500 feet of length each.

Excavation will start at about Station 108+00 and end at about 492+00. The following construction and revegetation techniques will be used to restore the trees and shrubs lost through construction:

1. Construct all channels from one side and stack the spoil,
2. Shape the spoil bank to 3 to 1 side slopes and a flat top. The height should not exceed 6 feet, but should be stacked as near to 6 feet as the amount of spoil will permit,
3. When clearing the opposite side, retain the mast-bearing trees. When possible, this should also be done on the spoil bank side. Biologist assistance will be used in determining the trees to be retained in the easement area,
4. The spoil bank and the berm between the bank and the channel will be established and maintained in vegetation to provide wild-life food and cover and prevent erosion.

- a. The side slopes of the spoil bank will be seeded with shrub lespedeza.
- b. The top of the spoil bank will be seeded with lovegrass at a partial rate to make clumps of grass instead of a solid cover. One row of nut or fruit-bearing tree species will be set on a 50-foot spacing. Halfway between each tree a nut or fruit-bearing shrub will be set. The tree species could be black walnut, pecan, sawtooth oak, chestnut, or mulberry. The shrub species could be hazelnut (filbert), autumn olive, or bush honeysuckle. A mixed planting of all species would be desirable; however, this will have to be determined by the availability of the planting material at the time of establishment. To control competition, trees and shrubs will be protected with a 4-foot square of black plastic mulch.
- c. The berm should be seeded to lovegrass at a partial rate to make a clumpy cover.
- d. The spoil bank and berm will be fenced from grazing when adjacent to areas that will be pastured.

The sketch on page 5 illustrates the clearing, excavation and spoil disposal.

The channel work is designed to remove the 2-year, 24-hour flood volume within safe duration limits of expected land use. The required discharge capacities were established to provide or reduce flood damage within safe limits for sustained agricultural production.

Outlet conditions of the watershed are adequate. The drainage area of the Obion River is about 2,020 square miles at its confluence with Daugherty Creek. The river was deepened about 10 or 12 feet at this junction in the early 1960's. This deepening created a relatively steep channel gradient at the outlet of Bogota Watershed. Minor erosion has taken place but the outlet has stabilized.

The Obion River is classified by the U.S. Coast Guard as a navigable stream. Current uses are limited to small boats and crafts with no record of commercial navigation. The proposed works of improvement in the Bogota Watershed will have no effect on navigation on the Obion River.

A low-flow frequency analysis of the Obion River shows that water 5 feet deep or greater is maintained at least 50 percent of the time.

Daugherty Creek channel bottom will enter the river at elevation 244 feet (MSL) -- 5 feet above the bottom of the Obion River.

The sketch on page 6 illustrates the plan and profile of the main channel.

Stability of the channel will not be a problem because of the low velocities and the high plastic index of the soils involved. The

proposed channel will be excavated in highly to moderately plastic, silty clay and clayey silt soils, according to the published Dyer County Soil Survey. The primary soils encountered are Alligator, Sharkey and Forestdale. Small areas of Dundee are interspaced between Valley Section 11, Valley Section 12, and Valley Section 13 on Lateral 7. Alligator and Sharkey are highly plastic, sticky clays with high shrink, swell potential. They are classified as highly plastic clays (CH) by the Unified Soil Classification System. (2) Forestdale varies from a silty loam at the surface (0-11 inches) to moderately plastic clay (11-20 inches) and highly plastic clay (20 inches) (CH-MH) subsoil. Dundee varies from a clay loam at the surface to a moderately plastic clay (CL) in the subsoil. The plastic indices of Sharkey and Alligator soil range from 33-35, Forestdale ranges from 17-23, and Dundee has a plastic index below 10.

Deepening of the channel will necessitate reinforcing or underpinning the piers and abutments of four bridges located as follows:

- a. Tennessee State Highway 103 and Daugherty Creek;
- b. Tennessee State Highway 103 and Lateral 7;
- c. Secondary gravel road crossing west of and downstream from the junction of Tennessee State Highway 78 and Lateral 7; and
- d. Secondary gravel road crossing west and downstream from the junction of Tennessee State Highway 78 and Daugherty Creek.

Constructing the stream channels will require that five new wooden bridges, fords, or culverts of adequate design be installed to replace inadequate existing structures. The locations of the five are as follows:

- a. Secondary gravel road crossing Daugherty Creek upstream from outlet,
- b. Secondary gravel road crossing Lateral 7 immediately upstream from Tennessee State Highway 78,
- c. Secondary gravel road crossing Lateral 7 immediately upstream from Lateral 9,
- d. Secondary gravel road crossing Lateral 9,
- e. Secondary gravel road crossing Lateral 6 north of Tennessee State Highway 103 near Miston.

As a safeguard against the degradation potential above the excavation on Daugherty Creek, a grade stabilization structure will be installed on Daugherty Creek at Station 108+00. This structure will consist of two rows of sheet piling driven to grade about 20 feet apart and at right angles to the centerline of the channel. The open space between the two rows of pilings will be excavated to a depth of 18 to 24 inches and backfilled with large rock riprap. The rock riprap will extend across the bottom, on the side slopes and 5 to 10 feet up and downstream from the structure. Islands of compacted earth fill will be constructed on each side of the channel to divert any excess overflow around and away from the structure.

About 32 pipe drop structures will be needed for field, minor tributary, and road drains. Excavated inlets or other suitable grade control will be provided as needed. Pipe drops will be used where feasible to provide crossings for the channel maintenance road which will be constructed on one side of the channel.

Clearing and debris removal is planned on about 7,900 feet of existing channels as follows:

- a. About 1,700 feet on Daugherty Creek outlet; and
- b. About 6,200 feet on Lateral 2.

Work on Lateral 2 and its outlet will consist primarily of minor clearing and the removal of drifts, brush, and trees within the wetted perimeter. Clearing and snagging is illustrated on the sketch map on page 5.

The total easement area for the channel work contains 453 acres. Under the present conditions, this area consists of 69 acres of existing channel, 23 acres of forest land, 307 acres of cropland, 10 acres of pastureland, and 44 acres of spoil area. After completion of the channel work, the easement area will contain 41 acres of grass, 113 acres of spoil area that will be revegetated to trees and shrubs, 77 acres of channel, and 222 acres of cropland. The entire 453 acres under easement will be available for use as a maintenance area throughout the life of the project.

The proposed project will not require the displacement or relocation of any person, business, or farm operation.

The Soil Conservation Service will provide technical assistance for design, preparation of specifications, construction inspection, final inspection, execution of certificates of completion, and related tasks for the establishment of all planned works of improvement. The Bogota Drainage District will be the sponsor dealing directly with the Service.

A variety of measures will be used to control erosion, water, air and noise pollution. Some practices to control erosion will be: leave native vegetation where possible (channels), temporary vegetation, orders of work, control of the location of parking areas, work areas, and access roads. Measures for air pollution control will be: watering of access roads, work areas and borrow areas to control dust; proper emission control devices on equipment; and other state, local and Service regulations. Noise pollution will be controlled by proper equipment operation and maintenance.

There will be an increase in sediment load during construction. Sediment traps will be constructed in the channel to trap a major portion of the eroding materials during construction.

If artifacts or other objects of historical or archaeological value are discovered during construction, the Tennessee Historical Commission, Tennessee Department of Conservation - Division of Archaeology, and the National Park Service will be notified.

Operation and Maintenance

The sponsors of the Bogota Watershed project plan to install the land treatment and structural measures during a 3-year period.

Landowners will be responsible for the maintenance of land treatment measures installed on their farms under agreement with either the Dyer County Soil Conservation District or the Obion County Soil Conservation District. The Tennessee Division of Forestry, in cooperation with the U.S. Forest Service will furnish the technical assistance necessary to operate and maintain the forestry measures under the going Cooperative Forest Management Program. Fire protection will be continued by the Cooperative Forest Fire Control Program.

The drainage district will be responsible for adequately operating and maintaining the stream channel vegetation and associated works at a total estimated cost of \$8,200 annually. The district will arrange with the landowners and operators for minor maintenance jobs to be done as a part of their regular farm operations, estimated to be \$3,200 annually. The major maintenance jobs, estimated to cost \$5,000 annually, will be accomplished by the district. The sponsors will provide, by annual assessment under the authority of the Tennessee Drainage District Act of 1909, as amended, whatever amount is needed for adequate maintenance.

The annual assessment needed for major maintenance jobs is estimated to be \$0.69 per acre per year.

The operation and maintenance of the improved stream channel will include, but may not necessarily be limited to, the removal of drifts and sediment bars from the channel and bridge openings and the control of obnoxious vegetative growth. Maintenance of improved channels is extremely important from the time of construction until adequate vegetation has been established. As the excavation will be done from one side only, the maintenance road will be on the channel berm of the excavated side.

A plan of operation and maintenance for the channel will be prepared and made a part of the basic operation and maintenance agreement as soon as detailed needs can be determined from the design. This plan will include regular inspections, reseeding significant areas where vegetation has been destroyed by erosion, cutting or spraying undesirable trees and shrubs within the channel perimeter, removing and disposing of silt bars, removing and disposing of debris, adding riprap, if needed, keeping access roads for maintenance in good condition, rehabilitating damaged pipe inlets from fields or side channels, and other items as

needed to insure a stable channel that will function successfully. The plantings for wildlife food and cover will be maintained.

The use of chemical herbicides to control unwanted vegetation will be confined to the channel bottom and sides. Either the berm or channel can be used to provide access for ground-operated spray equipment. Herbicides used will be confined to only those that have USDA clearance for that purpose. All aerial spraying of herbicides will be prohibited. The shrub lespedeza should be clipped with a rotary-type mower every third year to retard growth of invading tree species and to thicken the shrub lespedeza canopy.

The Service and the sponsors will make a joint inspection annually, or after unusually severe floods, for 3 years following installation of each structural measure. Inspection after the third year will be made annually and after severe storms by the sponsors and a report prepared by them with a copy to the Service representative.

The Bogota Drainage District and the Service will execute specific operation and maintenance agreements prior to the issuance of invitations to bid on construction of any structural measure for flood prevention.

Project Costs

Total project installation costs are estimated to be \$654,900, of which \$347,800 will be borne by PL-566 funds and \$307,100 by other funds.

Conservation land treatment measure costs are estimated to be \$228,500, of which \$21,400 will be borne by PL-566 funds and \$207,100 other funds. Construction costs of structural measures are estimated to be \$247,000, borne 100 percent by PL-566 funds. Total installation costs of structural measures are estimated to be \$426,400, of which \$326,400 will be borne by PL-566 funds and \$100,000 by other funds (see Appendix A for Comparison of Benefits and Costs for Structural Measures).

ENVIRONMENTAL SETTING

Physical Resources

Bogota Watershed is located in Dyer and Obion Counties in the northwestern section of Tennessee. The watershed encompasses the drainage area of Daugherty Creek which originates in the hill section and flows southwest to a point approximately 1 mile west of Cat Corner. The creek channel flows across flat terrain from this point to the Obion River. The Bogota Drainage District which is a legal institution created in 1917 under the Tennessee Drainage Act of 1909 (3) constructed ditches from Obion River (located in the southern most part of the watershed) north to approximately the area where Daugherty Creek intersects Bruces Chapel and Miston to its confluence with the Obion River, about 3 miles south of Miston.

The Bogota Watershed is 10 miles north of Dyersburg, the county seat of Dyer County. It is 150 miles north of Memphis, Tennessee, with Tennessee Highway 78 traversing the watershed. The population of the watershed is 1,600, or 425 families, which are classified as mostly rural.

Boundaries Bogota Project					
Watershed Area		Drainage District		Flood Plain Area	
Acres	Sq. Miles	Acres	Sq. Miles	Acres	Sq. Miles
11,500	16.4	10,061	15.7	10,100	15.8

Approximately 8,765 acres of the flood plain is within the Bogota Drainage District.

The Bogota Watershed is part of the Lower Mississippi Water Resource Region (WRR) and is located in the Obion River subregion. The watershed is less than 0.001 percent of the WRR and is 0.9 percent of the subregion. (4) It is also located in the Southern Mississippi Valley alluvium and the Southern Mississippi Valley uplands major land resource area. The watershed is typical of most flat land watersheds in these regions with hard to define waterways.

Soil and water problem areas of the Bogota Watershed are: (1) 10,100 acres of flood plain, of which 2,235 acres located in the lower reach is common flood plain with the Obion River; (2) 1,400 acres of uplands which has some on-site erosion problems but contributes little to off-site sediment damages; (3) 35 miles of waterways with sedimentation, vegetation and debris problems; and (4) 5,000 acres of flood plain land that needs land treatment measures to maintain and improve productivity. The flood plain is broad, low-lying, very fertile, alluvial flats influenced by the Mississippi River and comprises 88 percent of the total

watershed. The flood plain is bisected by Daugherty Creek which is an ephemeral stream. The upland area of 1,400 acres is located in the northeastern section of the watershed and is characterized by deep v-shaped valleys and narrow sinuous ridges.

The soils consist of two major Associations - Alligator - Forestdale - Dundee located in the flood plain and the Memphis Association in the uplands. The flood plain soils are highly productive and are well suited to general or grain farming. These soils are part of the higher areas of the Mississippi River bottom and are formed from silt or clay that settled out of standing or slow moving waters. They are poorly drained or somewhat poorly drained and have a sub-soil of gray, acid clay. The higher bottoms were formed from silt, sand and a small amount of clay and are well drained to somewhat poorly drained. They are loamy and friable to a depth of several feet.

Soils in the upland areas are fertile but occur on narrow, winding, ridgetops with the long steep hillsides having slope ranges of 20 to 50 percent. The Memphis soil makes up 80 percent of the upland association and is windblown silt deposits. The hillside soils are fertile but are highly susceptible to erosion.

The land capability classification for the soils show the following groups:

Alligator-Forestdale- Dundee Association (Bottom Lands)		Memphis Association (Uplands)	
Class I	839 acres	Class I	168 acres
IIw	2104 acres	IIIe	210 acres
IIIw	7038 acres	IVe	742 acres
IIIs	72 acres	VIIe	280 acres
VIIw	47 acres		
<hr/>		<hr/>	
Total	10,100 acres	Total	1,400 acres

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are defined according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to management. The capability subclass is designated by a small letter following the Roman numeral and indicates the main limitation. The letter "e" shows the risk of erosion unless close growing plant cover is maintained; "w" shows that water in or on the soil interferes with plant growth or cultivation; and "s" shows the limitation of sand or stones. (5)

Geologic formations are unconsolidated sediments of the Mississippi Embayment section of the Gulf Coastal Plain physiographic province. Three distinctly different land forms are present. They include the flood plain of the Obion River, the alluvial plain of the Mississippi River, and the dissected silty uplands, all of which are Pleistocene in age except for recent deposits of the Obion River. (6)

The shape of the watershed is somewhat elongated with the major portion consisting of flat, low-lying bottoms with a small area of steep hills with gorge-like valleys. Elevations vary in the northeastern segment from elevation 440.0 (MSL) to elevation 254.0 (MSL) at the valley floor.

The climate is warm, temperate and humid. The average annual temperature is 60°F. Temperatures range from a mean of 40°F in January to 78°F in July. The average growing season is about 195 days, with the first and last killing frosts occurring in the months of October and April respectively.

Dyer and Lake Counties have an average rainfall of about 48 inches, with a low of 32 inches in 1941 and a high of 77 inches in 1957. The highest total for a month was 18 inches in January 1937. Monthly rainfall is greatest in the late winter or early spring and the driest season is mid-fall. There are about 140 days throughout the year with measurable precipitation.

The following table gives a monthly tabulation of precipitation data at Tiptonville: (7)

Month	Precipitation (1924-42)	
	Monthly Average	Inches
January		5.74
February		3.62
March		4.91
April		4.58
May		3.81
June		3.80
July		4.17
August		2.85
September		3.27
October		3.15
November		3.84
December		4.22

Mineral resources are few, although some open-pit mining for sand and gravel is done. This material is used locally for road surfacing.

Ample groundwater supplies are available within the watershed area. This Mississippi alluvial plain is underlain by gravel, sand and silt of Pleistocene age. An average of 65,000 gallons per day per foot of drawdown is pumped by a well in this area. Additional greater water supplies are available from the deeper Eocene sands. Water quality is generally good and is of the calcium-bicarbonate type.(8)

The following table shows the present land use in each area of the watershed.

Present Land Use	Upland		Flood Plain		Total	
	Acres	Percent	Acres	Percent	Acres	Percent
Cropland	165	12	8135	80	8300	72
Grassland	455	33	355	4	810	7
Forest Land	465	33	965	10	1430	12
Idle	275	20	195	2	470	4
Miscellaneous	40	2	450	4	490	5
	1,400	100	10,100	100	11,500	100

The flood plain is predominantly flat cropland with small areas of woodland scattered throughout. Farming operations in the flood plain occurs right up to the ditch banks and waterways where they are defined. The upland area is steep enough to inhibit the efficient use of farm machinery. There is a land use change trend occurring in the upland which includes cropland and idle land reverting to grassland or forest land.

The riparian or channel and bank area consisting of about a 50-foot strip on both sides of the channel was included in the land use for the flood plain in the above table. This area consists of the following uses:

Cropland	192 acres
Pastureland	10 acres
Forest Land	23 acres
Channel	69 acres*
Spoil	44 acres**
Total	338 acres

* 61 acres are trees and shrubs and 8 acres are open.

**All 44 acres are in trees and shrubs.

Daugherty Creek is the main stream within the watershed. Less prominent laterals are found throughout the watershed. All the streams are ephemeral in character, having flow during periods of surface run-off. Present stream classification is (M) manmade ditch or previously modified channel. The stream empties into the Obion River where channel work has been performed. The stream is classified by the Tennessee Water Quality Control Board, Department of Public Health, for fish and aquatic life; irrigation; and livestock watering and wildlife. (9)

The channel alteration work on the Obion River provides less than a once-in-3-year level of protection for all of the common flood plain in the watershed. The constructed Obion channel has a 100-foot bottom width at elevation 238 feet (MSL). The Bogota outlet channel has a present bottom width of 18-20 feet at elevation 244 feet (MSL). (10)

There are six 1-acre or larger farm ponds in the upland sections of the watershed.

Based on the U.S. Fish and Wildlife Service classification system (11) there are about 9,142 acres of Type 1 wetlands, and about 47 acres of Type 6 and 7 wetlands in the watershed.

There are five bridges on State Highways 78 and 103, twelve bridges on improved county roads and sixteen bridges on unimproved roads.

Present and Projected Population

The present population of Bogota Watershed is estimated to be about 1,600. Projections indicate that farms will continue to increase in size and decrease in numbers. Based on landowner interviews, the population is estimated to be about 800 in the year 2020.

Economic Resources

The economy of the Bogota Watershed area is based primarily on agriculture, with the major crops being cotton, corn, and soybeans. Frequent flooding on the fertile bottom lands, restrictions on local sources of operating capital, and limited opportunities for local employment have resulted in a declining economy of this watershed as compared to similar agricultural areas in Dyer, Lake, and Obion Counties.

Cotton provides about 35 percent of the agricultural income; corn, soybeans, and small grain provide 60 percent; livestock and livestock products provide 5 percent; and forestry provide less than 1 percent. Present average yields per acre are corn, 70 bu.; cotton 650 lbs.; soybeans, 20 bu.; and pasture, 6 AUM.

There are estimated to be about 425 families in the watershed. There are 140 parcels of privately-owned property. About 100 parcels of property are classified as general or cash grain farms. Farms are decreasing in number but increasing in size. The watershed is located within a highly mechanized farming area in Tennessee. As a result of the change to mechanization in the farming operations, a surplus of available labor has occurred. Most of the surplus labor has retired or moved to surrounding towns to seek employment. The remaining labor force is generally fully employed with seasonal underemployment when farm operations are near a standstill. The labor force is about 630 people. Estimates indicate that about 25 are unemployed and about 200 underemployed.

The average size farm is about 175 acres and varies from about 10 to 1,000 acres. About 5 percent of the 100 farms are classified as commercial and 95 percent are considered to be family farms. The current average value, including fixed improvements, of the farms in the flood plain is about \$85,000 and in the uplands is about \$35,000.

The public property in the watershed is confined to right-of-ways for roads. Tennessee State Highway 78 and 103 with a connecting system of county roads bisect the area. The north-south route of the Illinois Central Railroad parallels the western boundary. This system of roads provides easy access to nearby towns and markets.

Dyersburg, the county seat of Dyer County, is located about 10 miles south of the Bogota Watershed. It is the largest trade center in the area. The town of Ridgely, also a major market center is located about 6 miles to the north in Lake County.

The average market value of products sold per farm is estimated to be about \$12,500, with net income of less than \$4,000 per farm. Most of the retirees are recipients of social security, with an average monthly payment of about \$100. (12) Per capita income for 1973 was about \$2,700 as compared to the state per capita income of about \$2,900, and the national per capita income of about \$3,700.

Plant and Animal Resources

The predominant tree species in the upland forest land are yellow poplar, southern red oak, and white oak. The predominant tree species in the bottom lands are red oak, sweetgum, and hickory in the well-drained soils and cypress, willow, and sycamore on the poorly-drained soils. Plant species on the cropland are cotton, corn, soybeans, and small grain with the normal invasion of johnsongrass, smartweeds, and foxtail, which is characteristic of this section of Tennessee. Grasslands are composed of both warm season (bermudagrass) and cool season (tall fescue) grasses with the normal reversion to native grasses where management is deficient.

Fence rows are almost nonexistent. Approximately 15 miles of channel are the only vegetative edges present in the bottom lands. Most of these ditches have grown up in trees (some 10 to 14 inches in diameter) and other vegetation.

Plant community changes taking place are in those areas of upland that were formerly cropped and are now idle. These specific areas are reverting to forest land and are in the stages of plant succession going from annual plants through perennial herbaceous plants and grasses to woody plants. Other land uses are not displaying any particular change in plant communities.

Wildlife resources for the entire area are considered to be low since cropland is the major land use. Small scattered woodland tracts, grown-up ditches, and a few idle areas provide the only habitat for raccoon, squirrel, and rabbit. Hunting importance for these species

would be rated as low. Quail and dove are present in a few areas but receive light hunting pressure.

Stream fishery resources are insignificant due to the stream having an ephemeral flow. Fish use of the channels would be predicated by the intensity and duration of flooding. When floodwaters recede, fish use would be curtailed. The six farm ponds in the upland portion of the watershed have been stocked with bass and bluegill.

The common flood plain of Daugherty Creek and the Obion River provides some migratory waterfowl winter habitat. When the wooded areas at the lower end are flooded, waterfowl habitat conditions would be good. A small swamp is located in the upper end of the flood plain which will have some use by waterfowl. Beavers use this area and other water areas in the forest lands.

The only rare and endangered species of wildlife as identified by Bureau of Sports Fisheries and Wildlife that use this area is the southern bald eagle. There is a concentration of this bird species wintering in the Reelfoot Lake area (10 miles north) and the Bogota area would be included in the feeding zone. When floodwaters recede leaving shallow potholes of water with fish, feeding areas for this bird are present as the potholes go dry. The area of swamp land (see physical resources) would also be a feeding area.

Recreation Resources

Recreational resources are practically nonexistent. The only recreation within the watershed is hunting, primarily waterfowl. The Mississippi River, 8 miles west, and Reelfoot Lake, 10 miles north, provide the waterbased recreation. Six farm ponds in the hill area provide some fishing.

Archaeological, Historical and Unique Scenic Resources

The National Register of Historic Places does not list any site of historic interest in the watershed, (13) and no sites are in the process of being nominated to the Register. Coordination with the Tennessee Historical Commission and Tennessee Division of Archaeology indicated that no sites of historical or archaeological significance are located in the watershed.

According to data from the Chucalissa Indian Museum, no sites of archaeolgoical significance are present.

Soil, Water and Plant Management Status

Present trends in the watershed flood plain are a slight increase in cropland, grassland and miscellaneous areas and a decrease of about 400 acres in forest land. Additional cropland will be utilized primarily for soybeans.

Forty-three percent of the hill land formerly in row crops has been retired from cultivation and planted to grass or reverted to trees. The cropland is interspersed throughout the upland area in small tracts varying in size from 5 to 20 acres. Most of these are along the small draws or flatter parts of the ridge tops.

The following table shows present and projected future land use in the watershed:

Watershed Land Use

Land Use	Present		Projected Future	
	Acres	Percent	Acres	Percent
Cropland	8300	72	8890	77
Grassland	810	7	1030	9
Forest Land	1430	12	1030	9
Idle	470	4	0	0
Miscellaneous	490	5	550	5
Total	11,500	100	11,500	100

The watershed is serviced by the soil and water conservation districts of Dyer and Obion Counties. The districts were organized in 1940 and 1941, respectively. Soil surveys for Dyer and Obion Counties have been published by the U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the Tennessee Agricultural Experiment Station.

Owners of 70 farms, or 70 percent of the watershed area, are cooperating with the soil conservation districts, and about 53 percent have active conservation plans. Fifty-five percent of the needed soil and water conservation treatment measures have been applied, and about 100 acres of critically-eroding uplands have been stabilized.

Projects of Other Agencies

The Flood Control Act of 1948 authorized the Corps of Engineers, Memphis District, to make channel alterations on the Obion and Forked Deer Rivers and their principal tributaries. Construction by the Corps of Engineers has been completed on the Obion River in this area and extends upstream beyond where the Bogota project empties into the Obion River.

The U.S. Department of Agriculture has been directed to make a survey of the Obion River Basin. The survey will be made under the provisions of Section 6, Public Law 566, the Watershed Protection and Flood Prevention Act. Section 6 authorized the Secretary of Agriculture, in cooperation with other federal, state and local

agencies to make investigations and surveys of the watershed and rivers and other waterways as a basis for the development of coordinated programs. The study will give special attention to soil, water and related development opportunities to stimulate economic growth and enhance the welfare of the people of the basin.

WATER AND RELATED LAND RESOURCE PROBLEMS

The major problem areas in the Bogota Watershed are 10,100 acres of flood plain lands on which floodwater damages occur; 1,400 acres of uplands which have some on-site erosion problems but contribute little to off-site sediment damages; 35 miles of waterways with sedimentation, vegetation and debris problems; and 5,000 acres of flood plain that needs land treatment measures to maintain and improve production. Other problems related to the water management include mosquitoes, midges, and other pesky water-related insects, beavers, and interruption of traffic when roads and bridges are flooded. Associated resource development needs are minor with respect to recreation, distribution of income, fish and wildlife habitat, livestock and crop production, forest land management, and environmental enhancement other than water management.

Land and Water Management

Ownership patterns, resource owner-operator arrangements, and the requirement for a large outlay of economic resources to solve the water management problem of flooding precludes any with hired labor, leasing investments for long range improvements other than land use, erosion control, and committed factors of production. An individual approach by resource owners is not a practical solution for solving the water management problem. There are some on-site erosion problems in the Bogota Watershed uplands that the current land and water management program of the Dyer County and Obion County Soil Conservation Districts are correcting through their present programs. Soils in this watershed do not present a fertility problem with normal application of plant nutrients, and use of crop residues.

The available water capacity of the Memphis Soils located in the upland is considered adequate for growing most plants. The steep slopes of the area will affect the moisture supply due to excessive relief.

The inherent characteristics of the soils in the flood plain problem area indicate slow permeability and poor drainage. The soil-water relationship problem is due to flooding, standing water, and the sticky-clay surface layers of some soils. In the flood plain there are low areas and irregular surface relief that contribute to the problem of water management.

Land adjustments in the upland are proceeding at a satisfactory rate and are projected to continue with technical assistance from the

local Soil Conservation Districts. Better management of plants will improve hydrologic conditions. Lack of vegetation management in most of the existing waterways and channels is a factor contributing to water management problems.

Landowners are willing and able to improve the land and water conditions in the uplands. This is demonstrated by the fact that 70 percent of the farms are cooperators and 53 have an active resource conservation plan for their farm with the Dyer County and Obion County Soil Conservation Districts. It is estimated that 95 percent will be cooperators by 1975 and 75 percent will be following a resource conservation plan.

Floodwater Damage

Frequent flooding of crops, pasture and roads is the primary problem in the Bogota Watershed. Floodwater damages occur from abnormally high direct precipitation. Flooding occurs on some portions of the 10,100 acre flood plain on the average of about twice a year during the cropping season and three to four times during the entire year. Durations of the flood cause stunting and killing of crops, especially young soybeans, cotton and corn. Deterioration of crops is increased due to the duration of flooding and harvesting of crops in impaired.

Spring floods frequently delay land preparation and planting of the bottom lands. Floods that occur after normal planting time make it necessary to prepare a new seedbed before replanting. Farmers are forced to substitute a short-season variety for a full-season variety or to change crops. The results of replanting include broken or uneven stands, increased cost of production and reduced net farm income.

Floodwater depths are rather shallow and velocities are low due to the slight variations in elevations. Durations of overbank flow generally last for several days. The shallow flooding of roads and low velocities of the floodwater results in deposition of silt on the roads which become hazardous to the traveling public.

The results of the frequent flooding is an estimated \$139,745 average annual damage to crops, pastures and associated indirect damage.

Portions of the main flood plain will flood following a rainfall of about 1.5 inches within a 24-hour period. Records indicate that Dyer and Lake Counties have an average rainfall of about 48 inches with a low of 32 inches in 1941 and a high of 77 inches in 1957. The highest total for a month was 18 inches in January 1937.

Investigations of present average channel capacities revealed that the channels are capable of removing only 0.34 inches of runoff per day. It would take approximately 6 days to remove 2.4 inches of runoff resulting from a 3.8 inch rainfall during a 24-hour period over the watershed. The following acre-frequency relationship table illustrates the probability of a flood occurring.

Area Flooded by Frequency of Storm Runoff

Recurrence Interval (Years)	Runoff (Inches)	% Chance of Occur. in a Given Year	Area Flooded (Acres)
0.5	1.31	200	3,790
1	1.83	100	4,825
2	2.38	50	5,670
5	3.14	20	7,460
10	3.71	10	8,540
25	4.50	4	10,100
50	5.10	2	10,100
100	5.70	1	10,100

About 2,235 acres in the lower end of the watershed is common flood plain of the Obion River. This area is subject to flooding from the Obion River as well as runoff from the Bogota Watershed.

Landowners report that average yields have been depressed by flooding. The following table shows the estimated percent yield losses and land use distribution:

Yield Losses Due to Flooding by Land Uses

Land Use	Distribution (%)	Yield Loss (%)
Cotton	13	18
Corn	12	25
Soybeans	56	30
Pasture	3	30
Woods	11	-
Miscellaneous	5	-

The magnitude of the flood problem is illustrated by the following reports: A Dyersburg newspaper, "The State Gazette", gave the following accounts of a 1932 and a 1937 flood:

January 21, 1932

"Several miles of Highway 20 west of Dyersburg are reported under water. Highway 103 from Bogota to Tennemo in Dyer County is partly under water and there is some water over Highway 78 from Dyersburg to Reelfoot Lake...."

February 11, 1937

"Visit by Boat to Bogota from Miston Reveals Large Section of This

Thriving Farming Community Now in Pitiful Shambles -

Floodwaters have laid untold waste over this thriving and fruitful region of Dyer County's delta...."

One of the largest storms in the past 32 years occurred on May 22-23, 1957. This storm produced 5 inches of rainfall in about 12 hours and had an estimated 4.3 inches of runoff. A Dyersburg newspaper, "The Guidepost", gave the following account of the flood:

May 23, 1957

"Heavy Damage by Winds and Rains in County. Several residents of Dyersburg and surrounding area are suffering considerable damage from the torrential rains and high winds that have been quite prevalent during the past week.... The high winds and rain that created all this havoc occurred about midnight Wednesday night, and it came with such force that great numbers of the residents got out of bed and headed for storm cellars or other points of safety. After the storm subsided, another one hit about 3 o'clock Thursday morning and those who weren't aroused by the first, joined their neighbors in seeking safe shelter...."

A Jackson newspaper, "The Jackson Sun", gave an account of the May 1957 flood in Dyer and Lake Counties:

May 24, 1957

"Dyer Flood Loss at \$3.5 Million; More Expected. The State Commissioner of Agriculture said today he will ask that two northwest Tennessee counties be declared disaster areas because of yesterday's flash floods... No estimate was available of the damage in nearby Lake County but Commissioner Buford Ellington said about 75 percent of the 15,000-acre cotton crop was damaged, 50 percent of the 12,000-acre soybean crop ruined, 8,000 acres of corn lost, along with 4,200 acres of small grains, and 750 acres of truck crops...."

The Bogota Watershed project was studied in five evaluation reaches. These are:

- Reach 1 - Obion River upstream to Highway 103
- Reach 2 - Highway 103 upstream to Highway 78
- Reach 3 - Highway 78 upstream to Tennessee Highway 8165
- Reach 4 - Lateral 7 from Highway 103 to Highway 78
- Reach 5 - Lateral 7 upstream from Highway 78.

The primary problem in all reaches is flooding; however, most of Reaches 1, 2, and 3 flood annually, and Reaches 4 and 5 flood at a lesser frequency.

Indirect damages are associated with the direct flood damages. The losses are less obvious but are just as real, and their effects are felt long after the flood has subsided. Indirect damages that occur

are disruption of employment, interruption of management, sales, etc., the disruption of traffic, mail delivery and school bus service, delay and inconvenience to the traveling public, and the interruption of the management, feeding, disease control program, and marketing of livestock and livestock products. These indirect damages amounted to \$12,705 annually.

Erosion Damage

While erosion is no longer a major off-site problem on the upland problem area, some acres of sheet and rill erosion do exist. At the time of the inventory (1970-71), approximately 165 acres of cropland, 455 acres of grassland and 340 acres of forest land had excessive erosion rates. Average estimated erosion rates were: cropland, 35 T/Ac/Yr.; grassland, 8.5 T/Ac/Yr.; forest land, 2.5 T/Ac/Yr. These rates are being reduced by present programs and management practices. There are no active critically-eroding areas in the watershed at this time. Water velocities are low during flood stages; therefore, scour damage is not a problem.

Sediment Damage

Overbank deposition of sediment on the flood plain area has not caused a loss in the productive capacities of the soils. The soil textures are very similar, and magnitude of the deposition is generally so slight that no significant damage results. The shallow flooding of roads and low velocities of the floodwater results in sediment deposition on the roads which is hazardous to the traveling public.

In recent years the high erosion rates of the uplands have been reduced by land use changes. Prior to these changes, sediment deposition in the channels, improper maintenance from 1941 to 1948, and some indiscriminate dumping in the channels contributed to the deterioration. As a result of these problems from 1941 to 1948, the channels have lost capacity due to sediment deposition, brush and tree growth, and debris. From 1948 to the present, the channel has stabilized and reached equilibrium except for continued plant growth and debris collection.

Average annual suspended sediment yield of the watershed is estimated to be about 4,170 tons/year, or 141 parts per million. The stream has virtually no bedload. This sediment load is rather insignificant when compared to the suspended load and bedload of the Obion River.

Drainage Problems

No project structural measures are deemed needed to meet current drainage requirements. The main and tributary channels have adequate depth for drainage but lack capacity for floodwater. The frequency, duration, and magnitude of overbank flow have retarded the practicability of maintaining adequate on-farm drainage systems. Associated on-farm drainage as a land treatment measure is needed to

assist the realization of maximum benefits from structural measures. Land smoothing, row arrangement, bedding and openfield drains will meet this need.

The soils in the flood plain are classified according to the limitation for crop production which is primarily an excess water problem due to frequent flooding. (5) The flood plain soils are described in the Physical Resource Section.

Irrigation Problems

Practically all of the soils in the Bogota Watershed would respond to irrigation. However, normal rainfall is usually sufficient to provide adequate moisture for good crop production.

An analysis of climatical data indicates that actual and potential evapotranspiration will occasionally exceed precipitation during the period from May through September. Supplemental water for irrigation during dry years can be secured from shallow wells by individual landowners.

Municipal and Industrial Water Problems

Reports of the Tennessee Water Resources Division and U.S. Geological Survey indicate that ample ground water supplies are available to meet any demand throughout this area. (8)

Recreation Problems

The nearest recreation area is the 10,000-acre Reelfoot Lake, located about 10 miles north of Bogota outside the watershed. This lake supplies most of the waterbased recreation needs of the people in the watershed.

Plant and Animal Problems

The trends of land use changes in the uplands (see soil, water and plant management status) will improve this area for forest game species of wildlife, but openland species will decline. The continued decrease of forest land in the bottom land will eliminate the forest game species habitat. The trend toward larger fields and use of cropland for soybean production has decreased the cover and availability of foods for rabbit and quail. Fence rows, field boundaries and ditch banks provide food and cover. More efficient tillage and use of herbicides in the cropping systems will decrease the incidence of food producers, such as foxtail, et al.

Beavers have become a problem in the water management system by plugging and damming of drainageways and outlet pipes with trees and other vegetation. Levees have been weakened by their burrowing activities.

Social and Economic Problems

The demographic makeup of the social and economic conditions in this watershed differs from that of the state and nation. The U.S. and Tennessee have both experienced population increases while the watershed has consistently decreased during the past 3 decades. This declining population has been plagued with a smaller percentage of male population and a larger percentage of more dependent young and old age groups. Employment opportunities have caused outmigration of the younger labor force as they complete their secondary education. The major portion of the civilian labor force is employed in agriculture.

The agricultural sector, in terms of both output and per capita income per employee, is comparable to that of Dyer County and Tennessee. However, payroll per employee in agriculture is very low when compared to other industries. The watershed area is in an economically-depressed area since about three of every five families in the region have a median family income of less than \$3,745, which is considered poverty level.

ENVIRONMENTAL IMPACT

Conservation Land Treatment

The voluntary application of land treatment measures and land use adjustments will assure the realization of benefits used in project justification, improve infiltration and physical condition of the soil, and aid in maintaining the effectiveness of group facilities. All of the lands within the watershed are eligible to receive assistance from conservation programs. The installation of measures for the conservation and improvement of natural resources on at least 5,910 acres of land is planned in the public and private interest. Application of the planned land treatment measures will reduce runoff and upland erosion. Erosion rates will be reduced by 60 percent. The environmental influence of the forest acres will be maintained by more intensive management.

Estimates indicate that there will be no increase in the total acreages of allotted crops within the watershed. Projected future land use in the flood plain "with" and "without" a watershed project is estimated to be:

Land Use	"Without" Project	"With" Project
	Acres	
Cropland	8,565	8,480
Grassland	455	455
Forest Land	565	565
Miscellaneous Use	515	600
TOTAL	10,100	10,100

The conversion of 150 acres of cropland to grassland or cropland-grassland rotation is the only land use change projected in the uplands. Cropland will decrease by 85 acres in the flood plain. These changes will cause a minor change in the plant communities. The reforestation of 120 acres of understocked stand will add a conifer to these acres of deciduous trees. The effect on the habitat will be minor. The forest management program will improve the quality of the forest habitat.

The land smoothing to remove the irregularities to avoid having the small water areas scattered over the flood plain when floodwater recedes will eliminate the incidental feeding areas for the southern bald eagle. The swamp area, which is a more significant feeding area, will not be affected by the channel work.

The changed land use and reduction of upland erosion rates will reduce gross erosion from 12,636 tons/year to 5,110 tons/year. Average annual suspended sediment concentrations will be reduced from 143 mg/l to 58 mg/l. The total sediment yield from the watershed will be reduced from 4,424 tons/year to 1,788 tons/year.

Conservation land treatment in the upland area will reduce erosion rates on the various land uses as follows: cropland from 35 T/Ac/Yr. to 10 T/Ac/Yr.; grassland from 8.5 T/Ac/Yr. to 3.0 T/Ac/Yr.; and forest land from 2.5 T/Ac/Yr. to 1.0 T/Ac/Yr.

Mosquitoes thrive in this section of Tennessee due to the prevalence of water areas frequently with emergent vegetation present. Whether this insect in this area is a vector or just a nuisance, the elimination of breeding habitat by a water management system of channels and land smoothing was considered. This would be done in such a manner as to preclude the creation of any stream pollution problems as recommended by the Tennessee Department of Public Health. (14)

Structural Measures

It is estimated that 10,100 acres of flood plain will be directly benefited by the 29.2 miles of channel work in Bogota Watershed. The Obion River provides less than once-in-3-year level of protection for the lower 6,000 feet of the watershed. When the Obion River floods, 2,235 acres in the lower end of Bogota Watershed will also flood and the watershed project will have little or no effect on this area. This could occur annually. When no backwater condition exists on the Obion, all of the Bogota Watershed flood plain will be benefited by the watershed project.

The channel work of the watershed project is designed to remove the runoff from a 3.8 inch rainfall within 24 hours (2-year, 24-hour frequency). The removal of this runoff within 24 hours will reduce direct agricultural damages by 73 percent and other indirect damages by 23 percent. Duration of flooding will be reduced about 83 percent.

The proposed project will reduce flood damages by 30 percent from storms similar to the May 1957 (25-year frequency) storm which produced 4.3 inches of runoff.

These streams have only ephemeral flow, therefore, no change is expected on the quality or quantity of stream flow, water temperatures, coliform counts or agri-nutrients. There will be an increase in sediment load during construction. Sediment traps built in the channel will trap a major portion of the eroding material caused by construction. Gross erosion will depend primarily on amount and intensity of rainfall during construction. Channel erosion is not expected to be a problem during construction because of the highly plastic nature of the soils to be excavated and the low design velocities.

The channel work on 29.2 miles of stream channels will require about 453 acres of land rights. The present and future land use and values are as follows:

Land Use	Present (acres)	Future (acres)	Present Value	Future Value
Cropland	307	222	\$10,300	\$ 7,500
Pastureland	10	41 1/	200	800
Forest Land	23	113	5,600	27,500
Channel	69	77	3/	3/
Spoil	44	(113)2/	3/	3/
Total	453	453		

1/ Berm area will be revegetated to grass.

2/ Spoil area will be revegetated to trees and shrubs.

3/ Environmental.

The net value of products produced on 222 acres of cropland and 10 acres of pastureland in the land rights area will only be lost during one cropping season.

About 85 acres of cropland will be permanently lost but will be directed to wildlife habitat. The loss to timber production on 23 acres will be deferred income which will accrue within a period of about 30 years.

The riparian or channel and bank area as shown in the environmental setting is included in the 453 acres of total easement area. The 61 acres of trees and shrubs in the present channel will be cleared for the installation of the 77 acres of channel. The present 44 acres of spoil area will be increased to 113 acres and will be reestablished in wildlife food and cover-producing trees and shrubs. The 41 acres of maintenance area (berm) located between the spoil and the channel will be established in a grass cover. The loss of the 61 acres of trees and shrubs in the present channel will be replaced by the 15⁴ acres of wildlife food and cover on the spoil and maintenance area.

The small area of wetland type 6 and 7 will not be affected by the project because the channel work terminates downstream from the area. Flooding will still occur on the type 1 wetland and the conditions for waterfowl use will be unchanged.

Economic and Social

Flood damage reductions provided by the project will allow the orderly growth and continued development of this rural agricultural community. The health and welfare of the citizens will be greatly enhanced. Private expenditures for replacement of the flood losses can be used to increase standards of living. The project measures will help sustain present employment and create six new jobs and provide 60 man-years of semi-skilled employment during the installation period (3 years). Employment for the workforce now migrating to other sections of the country will be available within the community. Estimates indicate that gross annual farm income per farm will be increased by about \$3,000.

Local secondary benefits will accrue in the watershed and surrounding area due to the installation of project measures. Goods and services produced as a result of the project will tend to stimulate local activity on a permanent basis. Products produced will require additional services from within the area.

Benefits will accrue due to the financial and technical assistance made available by the installation of the watershed project. The project will bring outside resources into the community and will provide an opportunity to use goods, services, and labor available in the local area.

The proposed improvement in the Bogota Watershed constitutes a needed and harmonious element in the overall economic development program for Dyer, Lake, and Obion Counties. Economic benefits used in project justification as well as the financial and technical assistance provided as a result of project installation will have a socio-economic impact on the community and surrounding area by improving, conserving, and utilizing the available natural and human resources. It is estimated that 90 percent of the watershed area, or 126 parcels of property, will be directly benefited, and all of the 1,600 residents will be directly or indirectly benefited.

The Tennessee Historical Commission reports that no sites for historic preservation will be affected by the project.

Reduction in the duration of flooding will permit farmers to receive greater returns for their management and technology. The protection afforded will stimulate the farmers to increase their management inputs, such as to fertilize more efficiently, establish more effective on-farm drainage systems, and use improved varieties of seed. Farm income will be increased by about 35 percent due to decreased unit costs of production, increased mechanization and efficiency in farming operations.

Favorable Environmental Impacts

The following is a summary of the environmental impacts that are assessed as being favorable:

1. Erosion rates for the uplands will be reduced by 60 percent: Reductions are cropland-25 tons/acre/year, grassland-5.5 tons/acre/year, and forest land-1.5 tons/acre/year,
2. Gross erosion will be reduced from 12,636 tons/year to 5,110 tons/year,
3. Plant species diversity will be improved on 120 acres of forest land by adding conifers,
4. Average annual suspended sediment concentration will be reduced from 143 ppm to 58 ppm,
5. Total sediment yield from the watershed will be reduced from 4,424 tons/year to 1,788 tons/year,
6. Mosquito production will be reduced,
7. Direct agricultural damages by flooding will be reduced by 73 percent, and indirect damages will be reduced by 23 percent,
8. Duration of flooding will be reduced by 83 percent,
9. Gross annual farm income per farm will be increased by about \$3,000, or about 35 percent,
10. The 1,600 residents will be directly or indirectly benefited,
11. One hundred fifty-four acres of wildlife food and cover will be established on the spoil and berm of the new channels.

Adverse Environmental Effects

1. The incidental feeding areas of the southern bald eagle will be eliminated by the land smoothing,

2. Sixty-one acres of trees and shrubs will be lost to channel construction,
3. Two hundred twenty-two acres of cropland and 10 acres of pasture will be lost temporarily to construction,
4. Eighty-five acres of cropland will be lost permanently to construction,
5. Minor increases in sediment load during construction,
6. Decline in visual quality until vegetation is reestablished,
7. Reduction in air quality during construction.

ALTERNATIVES

Five major alternatives to the proposed project were considered during the planning process. They were: (1) Acceleration of Conservation Land Treatment; (2) Flood Plain Management; (3) A Floodwater Retarding Structure; (4) Channel Work; and (5) No Project.

Alternative 1 - Acceleration of Conservation Land Treatment

Acceleration of conservation land treatment was considered as the first alternative. Land Treatment is needed on 8,190 acres of cropland, 860 acres of pastureland, and 830 acres of forest land. The major land treatment measures needed on upland areas are conservation cropping system, minimum tillage and diversions on cropland; pasture and hayland renovation, management and planting on pastureland; and forest management on forest land. Land treatment on the flood plain area would consist of land smoothing to remove irregularities on the surface of the flood plain, management of plant residues left on cultivated fields, row arrangements (bedding), and field drainage systems. The total estimated installation costs of the needed conservation land treatment are \$386,500.

Land use adjustments and better management of plants would improve hydrologic conditions. Annual flood damage reduction benefits to be derived from land treatment measures were estimated to be \$7,000, a reduction of less than 4 percent. Installation of the conservation measures on the upland area would reduce average annual sediment yields from 4,424 tons to 1,788 tons.

Environmental conditions would be enhanced with the reduction of upland soil movement, improved land use, and elimination of part of the on-site water problems. Some vector and other nuisance insect control would be provided. Wildlife habitat would be improved in the upland by the land use diversity and increase of edge. Wildlife habitat of the wetland related species would be disturbed due to land leveling and other water management practices. The total land treatment alternative would have little effect on the sedimentation, vegetation and debris problems along the 35 miles of waterways.

Alternative 2 - Flood Plain Management

Flood plain management, including accelerated land treatment, consisting of an adjustment of land use based on flooding hazards and the land capability system was considered. Areas subject to flooding once every 2 years or less frequent and that are Class I, IIw, and IIIw land were managed for cropland. Areas subject to flooding annually and that are Class I, IIw, and IIIw land were managed for grassland. Areas subject to flooding more than annually were managed for woodland. Land use changes in the flood plain would be as follows:

	<u>Present</u>	<u>"With" Flood Plain Management</u>
Cropland	8,135	4,430
Grassland	355	845
Forest Land	965	4,315
Idle	195	-
Miscellaneous	450	510
 Total	 10,100	 10,100

These changes in land use would decrease annual net income in the flood plain by about \$157,000. Conversion costs for these land use changes was estimated to be \$350,000.

Environmental conditions in the upland would be enhanced, as described in Alternative 1. Wildlife habitat (food, cover and edge) in the flood plain would increase extensively with the 3,350 acre increase of forest land. Wildlife habitat, primarily wetland associated species, would also increase with the increase in forest land. Vectors and nuisance insects would have increased with the continued wet conditions of this area.

Alternative 3 - A Floodwater Retarding Structure

A floodwater-retarding structure with 1,280 acres of drainage area was studied. This structure would control about 57 percent of the upland drainage area but only 11 percent of the total watershed would be behind the structure. The flood control structure would create a 35-acre sediment pool and a 110-acre flood pool.

Land use changes would be (1) 10 acres of woods and 25 acres of cropland converted to water; (2) 10 acres of woods and 10 acres of grassland lost to dam, borrow and work area; and (3) 15 acres of woods, 50 acres of cropland, and 35 acres of grassland in the temporary flood pool.

This structure would reduce flood damages by about 53 percent in the area upstream from Highway 78 and would have insignificant effects downstream from this highway. Annual benefits amounted to \$7,356. The estimated installation cost is \$416,500 and the benefit-cost ratio would be about 0.3 to 1.0.

Alternative 4 - Channel Work

The installation cost of a channel that would remove the runoff from the 1-year, 24-hour frequency storm within 24 hours was estimated to be \$354,500. The modification with this channel design would reduce flood damages about 46 percent and yield a benefit-cost ratio of 1.6 to 1.0.

Environmental changes with the channel work would be initially in the riparian area described in the environmental setting section. The channel work would require clearing the trees and bushes from the existing channel and bank area. The present channel would have to be enlarged to carry the runoff for the designed flood protection. With the channel work installed, additional environmental changes would occur, particularly in the capability class IIIw land, such as land use conversion from forest land to cropland and animal communities changing from wooded wetland associations to those associated with open land conditions used for agricultural crop production. Vectors and nuisance insects associated with water would be sharply reduced. The effects of the two channel designs on environmental values were not significantly different due to the fact that the major clearing was in the existing channel and bank area and additional land disturbed was about the same.

Alternative 5 - No Project

The alternative of no planned project with projected future conditions was considered.

Flooding would continue to occur at the rate of three to four events per year with at least two of these floods occurring during the cropping season (April through November). The present flood damages would increase at an accelerated rate as production cost items, interest rates, value of products produced, yields, and demands increase.

Land treatment in the uplands would continue with the present conservation program of the Dyer and Obion Counties Soil Conservation District Programs. While erosion rates would decrease to more acceptable levels, there would be no noticeable effect on the rates of runoff from the hill lands. It was estimated that landowners in the flood plain would continue individual water management solutions but flooding and the "piecemeal" approach would counteract most of the benefits.

The average annual benefits foregone without a project are \$72,146. If the present flood damages of \$139,775 were allowed to continue for 50 years, capitalized damages would amount to about \$21,900,000 at 5-5/8 percent interest.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Land use within the Bogota Watershed is totally agricultural-oriented and is in private ownership. The project will furnish flood reduction for agricultural production and will provide areas of wildlife habitat for upland type game. No changes in land use are proposed which will significantly restrict options for future use or limit productivity. Proposed land treatment measures will meet the needs for sustained productivity.

Through continued maintenance of project measures, the project will still provide benefits and be effective in conserving the natural resources in the watershed long after the 50-year project evaluation period.

The Bogota Watershed is located in the Obion-Forked Deer River Sub-Basin which is a part of the Lower Mississippi River Water Resource Region.

Watershed work plans have been prepared and approved on about 35 percent of the drainage area of the Obion-Forked Deer River Sub-Basin under the authority of PL-566, as amended. A type IV river basin study is now in progress on the entire Obion-Forked Deer River Basin.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

About 453 acres of land resource will be needed for easement area and construction of the improved channel system and installation of the wildlife habitat restoration measures. Only 77 acres will be committed to the channel and is irreversible. The remaining land along the channel may be used by wildlife. No other permanent commitment of resources is required for this project.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

General

An application for project planning assistance was filed on or about August 17, 1962, with the State Soil Conservation Committee by the sponsoring organizations which are the Bogota Drainage District, Dyer County Soil Conservation District, and the Obion County Soil Conservation District. The State Soil Conservation Committee approved the application and submitted it on October 19, 1962, to the United States Department of Agriculture. Preliminary investigations, which consisted of data gathering, was initiated on April 1, 1969, by the Soil Conservation Service. The preliminary investigations indicated a physically and economically feasible project with an estimated benefit-cost ratio of 2.8:1.0 using the 1970 current interest rate of 5-1/8 percent.

A public informational meeting was held on October 14, 1970, prior to requesting planning authorization for the watershed to present the

preliminary investigation report. All interested agencies, groups, and individuals were invited to attend and to comment or ask questions about the report.

A joint study and analysis of fish and wildlife values in the watershed was made by biologists of the U.S. Fish and Wildlife Service, Tennessee Game and Fish Commission, and U.S. Soil Conservation Service. This study was made during the preliminary investigation of the watershed. The work group suggested methods to minimize disturbance and measures to replace wildlife habitat along the sections of channels to be improved. These suggestions were agreed to and incorporated in the work plan.

After preliminary draft of the work plan has been developed and tentatively agreed upon by the sponsors, a second public meeting was held to explain the plan and solicit public reaction. This meeting was held in the watershed on October 21, 1971. All recommendations and suggestions by interested agencies and individuals were considered during work plan development.

Agencies contacted for suggestions and consultation during the planning process included the Memphis District of the Corps of Engineers, Region IV of the Environmental Protection Agency, U.S. Fish and Wildlife Service, Tennessee Department of Public Health, Tennessee Wildlife Resources Agency, Tennessee Conservation Department, and the Tennessee Historical Commission.

A public informational meeting was held on March 28, 1974, to discuss the draft work plan. Comments and suggestions from previous meetings and correspondence had been incorporated in the plan. The meeting was attended by over 30 people. Several minor editorial changes were incorporated in the plan. There were no objections voiced to the proposed plan.

Several meetings were held in the watershed by the sponsors. All of these meetings were open and were designed to allow ample opportunity for the sponsors, organizations, agencies, and the general public to participate in the development of objectives, consider a wide range of alternatives, to raise issues and to provide inputs into the planning process. Minutes of these meetings are on file with the Bogota Drainage District, 113 St. John Avenue, Dyersburg, Tennessee.

CONSULTATION

The work plan and environmental statement have been prepared considering comments and recommendations provided by the Sponsors, interested State and Federal agencies, and other groups.

Comments were requested on the draft work plan and draft environmental impact statement from the following agencies, groups, and individuals:

Department of the Army	University of Tennessee
Department of the Interior	Extension Leader, Obion County
Department of Commerce	Tennessee
Department of Health, Education, and Welfare	Extension Leader, Dyer County
Department of Transportation	Tennessee
Office of Equal Opportunity	Tennessee Commissioner of
Environmental Protection Agency	Agriculture
Federal Power Commission	Tennessee Commissioner of
Advisory Council on Historic Preservation	Conservation
Office of Urban and Federal Affairs (State Clearinghouse)	Tennessee Soil Conservation
Northwest Tennessee Development District	Committee
Natural Resources Defense Council	Executive Secretary, State Soil
Friends of the Earth	Conservation Committee
Environmental Defense Fund	Director, Tennessee Wildlife
National Wildlife Federation	Resources Commission
National Audubon Society	Regional Clearinghouse, Southwest
Environmental Impact Assessment Project	Development District, Jackson,
Wildlife Management Institute	Tennessee
Tennessee Conservation League	Tennessee Association of Soil
Tennessee Chapter of the Wild- life Society	Conservation Districts
Director, Chucalissa Museum, Memphis, Tennessee	The Wildlife Society
Executive Director, Tennessee Conservation League	Cumberland-Harpeth Chapter,
Tennessee Environmental Council	National Audubon Society
Central Midwest Representative, National Audubon Society	Warioto Chapter, National
	Audubon Society

Discussions and Disposition of Each Comment on Draft Statement

Each issue, comment, or suggestion for improvement is summarized and a response given on the following pages. The original letters of comment appear in Appendix B.

U.S. Department of the Interior, Special Assistant to Secretary, Southeast Region, Atlanta, Georgia

Comment: No significant adverse impact related to geologic conditions is anticipated.

Response: None necessary.

Comment: Review of the statement and work plan does not indicate that the proposed action will have any long-term adverse effect on water resources.

Response: None necessary.

Comment: It appears that little or no actual hydrologic data were available for the study and to our knowledge no data have ever been collected on Daugherty Creek. However, based on data collected on the other small streams in west Tennessee, the design discharges shown in table 3 appear to be underestimated. Data for two of these streams are enclosed for your information.

Response: The required discharges shown in Table 3 were designed to remove a certain volume within safe duration limits of expected land use. The channels were not designed to accommodate instantaneous peak flow.

Comment: The draft environmental impact statement adequately describes fish and wildlife and mineral resources within the watershed and the anticipated project effects on these resources.

Response: None necessary.

Department of the Army, Memphis District, Corps of Engineers,
Memphis, Tennessee

The watershed work plan and draft environmental impact statement for the Bogota Watershed, Tennessee, have been reviewed as requested by letter dated 7 August 1974. The Bogota Watershed Project as recommended will apparently have no appreciable affect on existing or anticipated future projects of the U.S. Army Corps of Engineers. Your efforts to coordinate planning of watershed projects with this office are appreciated.

Office of Urban and Federal Affairs, State of Tennessee, Nashville,
Tennessee

Comment: Wildlife Considerations - Since Daugherty Creek and its tributaries are dry a few months each year, there will be no effect on stream fisheries of this watershed. We concur with plans to minimize siltation downstream during construction. Inasmuch as beaver ponds support fish populations and provide excellent wetland wildlife habitat in the upper watershed, we recommend that these areas, involving only a few acres, not be destroyed by laterals.

Response: The works of improvement as described in the watershed work plan and environmental impact statement will not affect the existing beaver ponds in the watershed.

Comment: Transportation Considerations - As noted in earlier comments, the proposed channel work will necessitate reinforcing underpinning the piers and abutments of certain bridges in the project area. Two of these bridges are located on State Route 103 at Daugherty Creek and at Lateral 7. Structural work proposed for these bridges should be coordinated with Mr. J. R. Simmons, Regional Engineer, Bureau of Highways, Jackson, Tennessee.

Response: The design for reinforcing or underpinning the piers and abutments of certain bridges in the project area will be coordinated with the Regional Engineer, Bureau of Highways at Jackson, Tennessee, during the final design of the works of improvement.

Department of Health, Education, and Welfare, Regional Environmental Officer, Office of Regional Director, Atlanta, Georgia

We have reviewed the subject draft Environmental Impact Statement. Based upon the data contained in the draft, it is our opinion that this proposed action will have only a minor impact upon the human environment with respect to the concerns of this Department.

Northwest Tennessee Development District, Martin, Tennessee

Our office is in receipt of your letter of August 7, 1974, transmitting the Watershed Work Plan for the Bogota Watershed and the Environmental Impact Statement for the Bogota Watershed. In accordance with development district procedures, we have reviewed these documents. Our review indicates that there are no conflicts with any existing or planned activities in the area. If we may be of further assistance to you in this matter, please do not hesitate to contact us.

Department of Transportation, U.S. Coast Guard

Comment: Water from the Bogota Watershed flows into the Obion River. The plan should discuss the impact of the project on the Obion River, which is navigable.

Response: A statement has been included (pg. 4, para. 5) in the Environmental Impact Statement as follows: The Obion River is classified by the U.S. Coast Guard as a navigable stream. Current uses are limited to small boats and crafts with no record of commercial navigation. The proposed works of improvement in the Bogota Watershed will have no effect on navigation on the Obion River.

U.S. Environmental Protection Agency, Region IV, Atlanta, Georgia

We have reviewed the Draft Environmental Impact Statement on the Bogota Watershed in Dyer and Obion Counties, Tennessee and have no objections to the action described. We believe, however, that the Statement could be improved by a fuller discussion of the effects of the project on water quality. These effects include: (1) increase of main stream velocities, (2) increase of channel erosion, (3) greater flood peaks downstream, (4) less assimilative capacity of new channels as compared to the vegetated ditches and channels, and (5) the carrying of pollution loads farther downstream and over a greater reach of the stream before being assimilated.

Comment: The main stream velocities will be increased, and, as a result, erosion within the channel will be greatly increased. This condition will continue as long as the channel is maintained.

Response: The velocities on Daugherty Creek will be increased, but the proposed channels are designed for non-erosive velocities to ensure channel stability. The channels were designed in accordance to Soil Conservation Service Technical Release No. 25, Planning and Design of Open Channels.

Comment: The new channels will have less assimilative capacity than the vegetated ditches and channels, and agricultural and domestic pollution loads will be carried farther downstream and over a greater reach of the stream before being assimilated.

Response: Vegetation will be reestablished in the channel and the above condition would be temporary. It is the judgment of the Soil Conservation Service based on experience that the overall effect of agricultural and domestic pollution loads on stream quality downstream will be negligible. Representatives from the Soil Conservation Service and Environmental Protection Agency have been conducting meetings in Washington to determine the needs for a stream monitoring system to collect water quality data to be used in future studies.

Comment: Flood peaks will be increased downstream. Although the Bogota Watershed by itself will not have a major effect on the Obion River, there are additional channelization projects within the Obion River Watershed which could have cumulative effects.

Response: There has been approximately 47 miles of channel work completed on three tributaries of the Obion River under PL-566. The total drainage area of the three tributaries is 103 sq. miles. In addition to the channel work, there has been 19 floodwater-retarding structures constructed

in the watershed area of the three tributaries. The total drainage area of the 19 structures is 20.4 sq. miles. The Soil Conservation Service feels that this control is more than adequate to offset any accumulative increase in peak discharge due to channel work in these three projects. There are other projects that are planned that contain dams, channel work and land treatment. The Bogota Creek Watershed project is the only PL-566 plan in the Obion Basin that does not contain any floodwater-retarding structures.

An investigation of stream gage records on the Obion River does not show any increases in stage from past channelization projects. The drainage area of the Bogota Watershed is only 0.8 of 1 percent of the total drainage area of the Obion River at the confluence. The flood plain of the Obion River in this area is very wide with a mild slope and contains a large capacity for the temporary storage of floodwater. The increase in peak discharge from the Bogota Watershed, due to channelization, is so minor and the effect rapidly diminishes when the peak reaches the common flood plain of the two streams that this will not have a major effect on the Obion River.

Comment: Since the watershed area is agricultural, the pesticides accumulated in the channel soil could possibly be released during dredging operations, and a small amount of residues released en masse could be potentially significant. We, therefore, recommend a sampling of existing channel bottoms to evaluate this potential problem.

Response: The Soil Conservation Service does not believe that the accumulation of pesticides in the channel soil will be a significant problem in the river system when compared to the total water system and water quality. The Soil Conservation Service is now in the process of developing procedures with EPA for monitoring streams for water quality on future projects.

Comment: We would like to point out that if the project is to proceed, appropriate Federal permits may be needed pursuant to the Federal Water Pollution Control Acts Amendments of 1972 (FWPCA). Daugherty Creek is "waters of the United States" into which "....the discharge of any pollutants by any person shall be unlawful" under Section 301(a) FWPCA. A violation of Section 301(a) of the FWPCA will occur unless a Federal permit is obtained for the discharge of pollutants into Daugherty Creek itself. Any discharge of dredged material or of fill material that fills or blocks portions of the stream's natural channel may require a Section 404 permit from the U.S. Army Corps of Engineers.

Discharges of pollutants other than dredged or fill material into Daugherty Creek may require Section 402 (NPDES) permits from the Environmental Protection Agency.

Response: The Bogota Watershed Board of Directors will make application for a dredging permit Section 404 from the U.S. Army Corps of Engineers when the project is approved by the State Conservationist. It was determined by a representative of EPA that Section 402 is not applicable to this project.

Comment: Utmost care should be taken to prevent spoil, etc., deposited on stream banks from washing or falling back into the stream since this may result in violation of Federal laws.

Response: Plans and specifications will be prepared to prevent spoil from washing or falling back into the streams at the time of the final design. These designs will be in compliance with Federal laws.

Advisory Council on Historic Preservation

This is in response to your request of August 7, 1974, for comments on the environmental statement for the Bogota Watershed, Dyer and Obion Counties, Tennessee. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that your draft environmental statement appears procedurally adequate. However, we have the following comments to make:

Comment: The National Register of Historic Places is updated in the Federal Register on the first Tuesday of every month. Future statements should indicate that the Soil Conservation Service has consulted the most recent cumulative listing (Federal Register, February 19, 1974) and its monthly supplements.

Response: The Soil Conservation Service uses the latest listings of the Federal Register.

Comment: If available, the Advisory Council requests that it be furnished with copies of the correspondence from Mr. Stephen S. Laurence and Dr. Gerald Smith, referred to in Appendix C, #13 of the environmental statement. Where possible, environmental statements should include copies of the comments received from the State Historic Preservation Officer.

Response: This information was transmitted to the Advisory Council on January 15, 1975.

Appendix A - Comparison of Benefits and Costs for Structural Measures

Appendix B - Letters of Comments Received on the Draft Environmental Impact Statement

Appendix C - Project Map

Appendix D - Bibliography

APPROVED BY

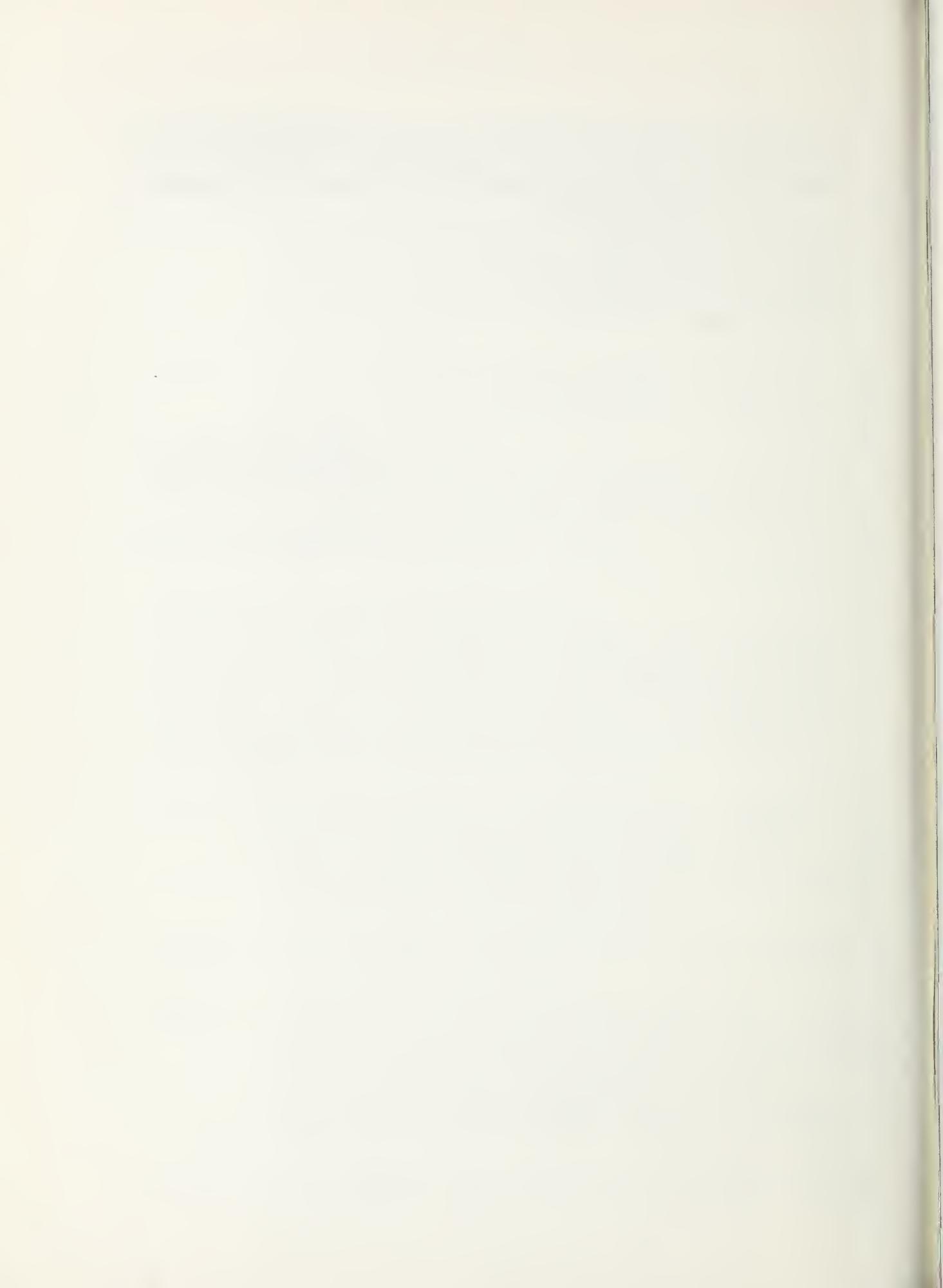
Donald C. Bevins

Donald C. Bevins

State Conservationist

Date

May 20, 1975



APPENDIX A

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES
 Bogota Watershed, Tennessee
 (Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/			Average Annual Cost	Benefit Cost Ratio
	Damage Reduction	Secondary	Total		
Stream Channel Work	96,715	9,275	105,990	30,957	3.4:1.0
Project Administration	•••••	•••••	•••••	2,887	•••••
GRAND TOTAL	96,715	9,275	105,990	33,844	3.1:1.0

1/ Price base - Current Normalized.

February 1975



United States Department of the Interior

OFFICE OF THE SECRETARY

Southeast Region / 148 Cain St., N.E. / Atlanta, Ga. 30303

ER-74/1019

September 30, 1974

Mr. Paul M. Howard
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
561 U.S. Courthouse
Nashville, Tennessee 37203

Dear Mr. Howard:

As requested in your August 7, 1974, letter to the Secretary of the Interior, we have reviewed the draft environmental statement for the proposed Bogota Watershed project, Dyer and Obion Counties, Tennessee, for its effects on national park areas and historic sites, outdoor recreation, geology, hydrology, fish and wildlife, and mineral resources.

We offer the following comments for your consideration:

No significant adverse impact related to geologic conditions is anticipated.

Review of the statement and work plan does not indicate that the proposed action will have any long-term adverse effect on water resources.

It appears that little or no actual hydrologic data were available for the study and to our knowledge no data have ever been collected on Daugherty Creek. However, based on data collected on other small streams in West Tennessee, the design discharges shown in table 3 appear to be underestimated. Data for two of these streams are enclosed for your information.

The draft environmental impact statement adequately describes fish and wildlife and mineral resources within the watershed and the anticipated project effects on these resources.

We have no further comments at this time. Thank you for the opportunity to review and comment on the draft statement.

Sincerely yours,

Jane Whelan
(Miss) Jane Whelan
Special Assistant to the Secretary
Southeast Region

Enclosures



OBION RIVER BASIN

07028940. Turkey Creek near Medina, Tenn.

Location -- Lat $35^{\circ} 47' 39''$, Long $88^{\circ} 48' 37''$, Gibson County, at county road (Lewis Road) bridge, 1.7 miles southwest of Medina.

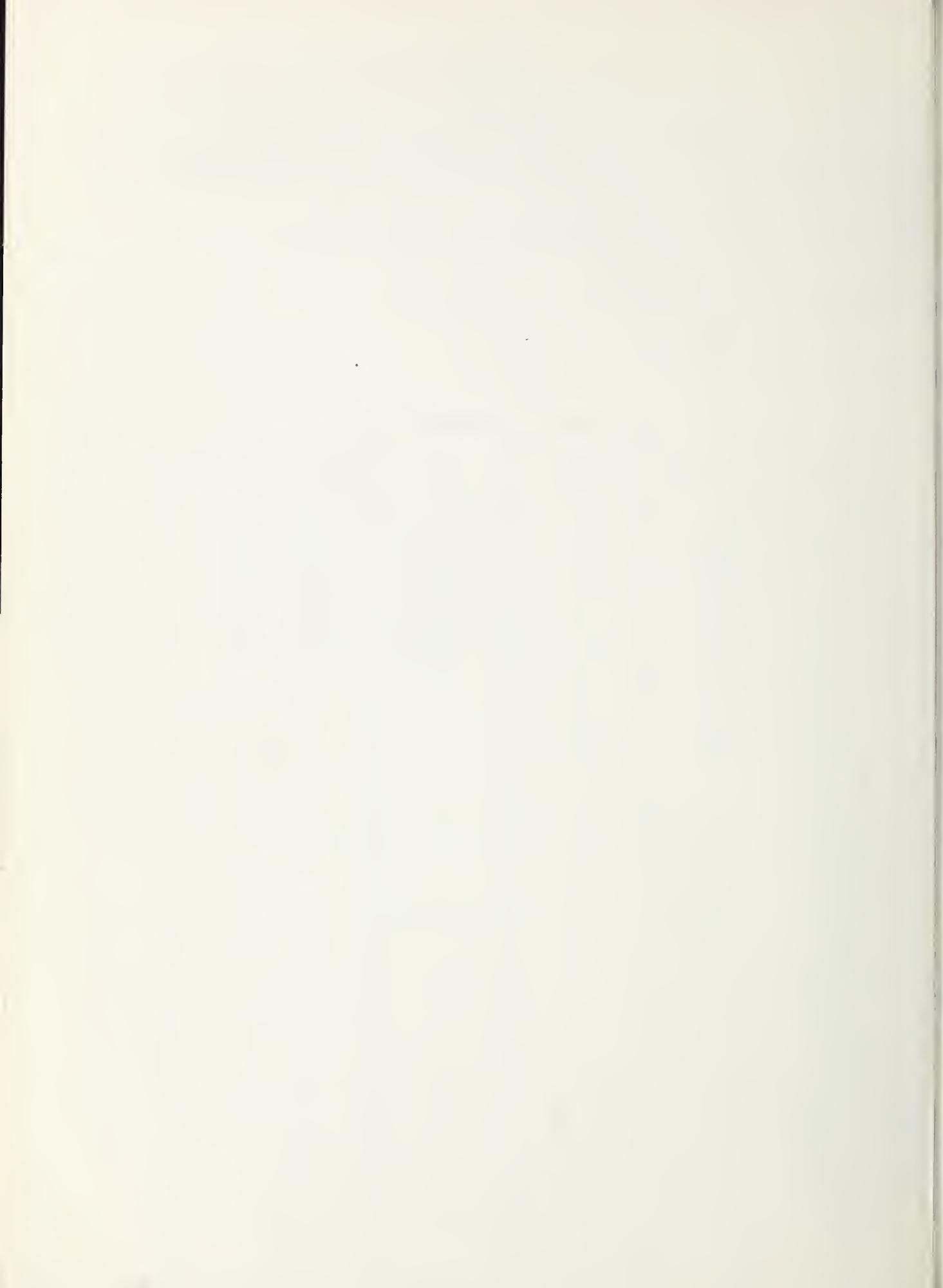
gage and history -- Circular-chart recorder, Apr. 21, 1967 to Mar. 18, 1969; digital punch-tape recorders, Mar. 19, 1969 to date.

Basin parameters. -- D. A. = 7.87 sq mi; L = 4.56 mi; H = 164 ft; S = 0.0051; Sg = 0.058.

Remarks. --Peak stages above 6.00 ft are listed.

Peak stages and discharges

Date	Stage (ft)	Discharge (cfs)	Available data	Date	Stage (ft)	Discharge (cfs)	Available data
5/13/67	14.03	3,060	3	6/11/73	11.47	2,290	1
5/14/67	12.57	2,620	1	6/19/73	9.50	1,700	1
3/11/68	11.22	2,200	3	11/26/73	7.22	1,070	1
4/ 9/68	9.20	1,610	3	11/27/73	6.28	835	1
5/16/68	6.77	958	3	11/27/73	9.53	1,710	1
11/28/68	9.25	1,620	2	1/ 9/74	6.47	882	1
4/19/70	6.79	962	1	1/10/74	9.42	1,680	1
4/24/70	6.25	828	1				
6/13/70	7.56	1,160	1				
6/15/70	7.04	1,030	1				
6/21/70	9.17	1,600	1				
9/ 5/70	13.88	3,010	1				
12/22/70	7.67	1,190	1				
2/12/71	7.07	1,030	1				
2/21/71	10.61	2,030	1				
8/22/71	6.67	932	1				
9/ 3/71	11.09	2,180	1				
10/24/71	7.64	1,180	1				
5/ 8/72	10.24	1,920	1				
7/ 2/72	8.01	1,280	3				
7/ 4/72	6.36	855	3				
7/16/72	15.98	3,740	1				
9/26/72	7.61	1,170	1				
10/18/72	11.81	2,390	1				
11/ 7/72	9.13	1,590	1				
12/ 8/72	10.20	1,910	1				
1/21/73	11.47	2,290	1				
2/ 6/73	11.09	2,180	1				
3/ 7/73	6.67	932	1				
3/11/73	8.35	1,370	1				
4/19/73	16.13	3,800	1				
5/27/73	9.60	1,730	1				



OBION RIVER BASIN

07028950. Turkey Creek at Fairview, Tenn.

Location. -- Lat $35^{\circ} 46' 07''$, Long $88^{\circ} 49' 59''$, Madison County, at bridge on U. S. Highway 45 E, 0.6 mile northeast of Fairview.

age and history. -- Digital punch-tape recorders, Apr. 18, 1967 to July 10, 1973. Station discontinued July 10, 1973.

basin parameters. -- D. A. = 13.3 sq mi; L = 6.78 mi; H = 183 ft; S = 0.0035; Sg = 0.060.

Remarks. -- Peaks above 700 cfs are listed.

Peak stages and discharges

Date	Stage (ft)	Discharge (cfs)	Available data	Date	Stage (ft)	Discharge (cfs)	Available data
5/13/67	14.01	2,720	1	7/ 2/72	9.86	1,120	1
5/14/67	13.92	2,610	1	7/ 4/72	11.89	1,620	1
12/ 2/67	8.72	856	1	7/16/72	15.42	6,360	1
2/ 1/68	8.44	791	1	9/26/72	11.24	1,460	1
3/11/68	8.84	883	1	9/29/72	9.53	1,040	1
3/21/68	13.66	2,360	1	10/18/72	14.37	3,390	1
4/ 4/68	12.56	1,820	1	11/ 7/72	13.18	2,090	1
5/16/68	10.80	1,350	1	12/ 8/72	14.05	2,780	1
11/28/68	13.26	2,130	1	1/21/73	14.39	3,430	1
4/17/69	8.68	846	1	2/ 6/73	14.12	2,890	1
8/18/69	8.17	728	1	3/11/73	11.40	1,500	2
12/29/69	9.45	1,020	1	4/19/73	15.10	5,400	1
3/ 3/70	10.14	1,180	1	5/27/73	12.72	1,890	1
4/ 1/70	8.11	715	1	6/11/73	12.81	1,920	1
4/19/70	12.07	1,670	1	6/19/73	12.88	1,950	1
4/24/70	11.79	1,600	1				
4/25/70	10.18	1,200	1				
6/13/70	12.13	1,690	1				
6/15/70	11.30	1,480	1				
6/18/70	9.82	1,110	1				
6/21/70	13.49	2,240	1				
9/ 5/70	13.72	2,410	3				
12/22/70	12.10	1,680	2				
2/12/71	11.91	1,630	2				
2/21/71	13.96	2,660	1				
4/ 1/71	9.39	1,010	1				
8/22/71	10.36	1,240	1				
9/ 3/71	13.47	2,240	1				
10/24/71	11.12	1,430	1				
4/21/72	8.28	754	1				
5/ 8/72	13.95	2,640	1				





APPENDIX B

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION IV
50 7TH STREET N.E.
ATLANTA, GEORGIA 30323

September 20, 1974

OFFICE OF THE
REGIONAL DIRECTOR

Re: 440-8-74

Mr. Paul M. Howard
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
561 U. S. Courthouse
Nashville, Tennessee 37203

Dear Mr. Howard:

Subject: Bogota Watershed
Dyer and Obion Counties
Tennessee

We have reviewed the subject draft Environmental Impact Statement. Based upon the data contained in the draft, it is our opinion that this proposed action will have only a minor impact upon the human environment with respect to the concerns of this Department.

Sincerely yours,

James E. Yarbrough
James E. Yarbrough
Regional Environmental Officer



Reply to
Attention of:

DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT, CORPS OF ENGINEERS
668 CLIFFORD DAVIS FEDERAL BUILDING
MEMPHIS, TENNESSEE 38103

LMMED-PF

APPENDIX B

7 October 1974

Mr. Paul M. Howard, State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
561 U.S. Courthouse
Nashville, Tennessee 37203

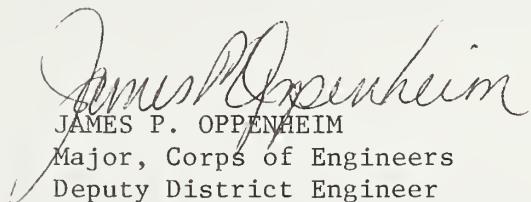
Dear Mr. Howard:

The watershed work plan and draft environmental impact statement for the Bogota Watershed, Tennessee, have been reviewed as requested by letter dated 7 August 1974.

The Bogota Watershed Project as recommended will apparently have no appreciable affect on existing or anticipated future projects of the U.S. Army Corps of Engineers.

Your efforts to coordinate planning of watershed projects with this office are appreciated.

Sincerely,


JAMES P. OPPENHEIM
Major, Corps of Engineers
Deputy District Engineer

- 2 Incl
1. EIS, Bogota Watershed
2. Watershed Work Plan,
Bogota Watershed





STATE OF TENNESSEE
OFFICE OF URBAN AND FEDERAL AFFAIRS

SUITE 1312
ANDREW JACKSON STATE OFFICE BUILDING
NASHVILLE 37219

AMES A. PAYNE
DIRECTOR

October 4, 1974

615-741-2714

Mr. Paul Howard, State Conservationist
Soil Conservation Service
561 U. S. Courthouse
Nashville, Tennessee 37203

RE: Bogota Watershed

Dear Mr. Howard:

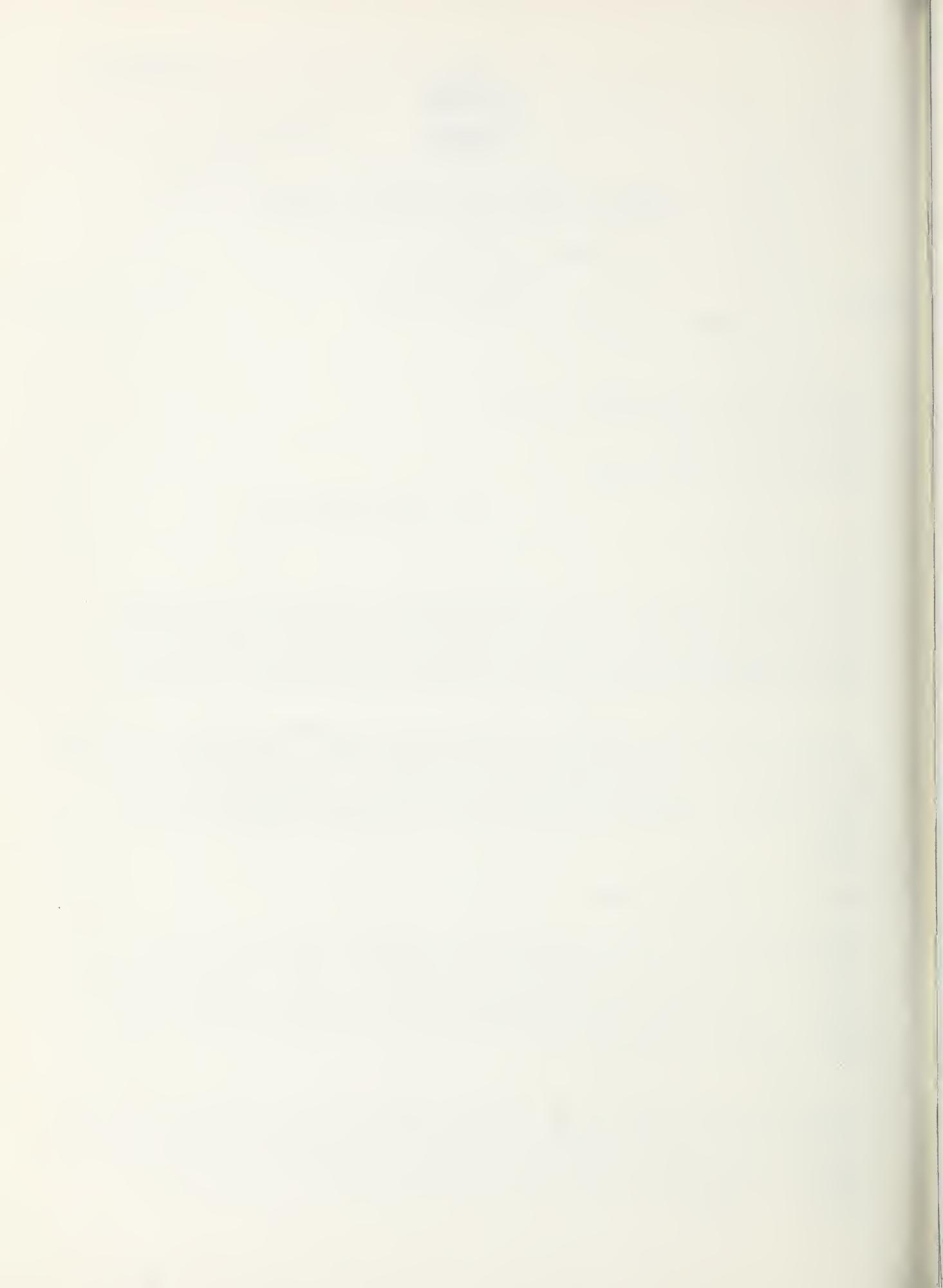
As the designated State Clearinghouse for Federal grant programs under OMB Circular A-95 guidelines, we have reviewed the revised draft environmental statement and work plan on the above referenced proposed watershed protection and flood prevention project, located in Obion and Dyer Counties, Tennessee.

No State agencies have identified conflicts with their current or planned activities, nor have significant environmental objections been raised. In addition to comments forwarded with our Clearinghouse letter of October 11, 1973, we wish to convey the substance of suggestions submitted by the Tennessee Wildlife Resources Agency and the Tennessee Department of Transportation regarding the subject project.

WILDLIFE CONSIDERATIONS:

Since Daugherty Creek and its tributaries are dry a few months each year, there will be no effect on stream fisheries of this watershed. We concur with plans to minimize siltation downstream during construction. Inasmuch as beaver ponds support fish populations and provide excellent wetland wildlife habitat in the upper watershed, we recommend that these areas, involving only a few acres, not be destroyed by laterals.

Since the vegetative borders of the stream support a high percentage of the limited wildlife habitat of the watershed, modification of 29.2 miles of channel will have at least temporary impact on wildlife. However, as an alternative to clearing of both sides, we concur with plans for work on one side only and revegetation with wildlife plantings.



Mr. Paul Howard, State Conservationist
October 4, 1974
Page 2

TRANSPORTATION CONSIDERATIONS:

As noted in earlier comments, the proposed channel work will necessitate reinforcing or underpinning the piers and abutments of certain bridges in the project area. Two of these bridges are located on State Route 103 at Daugherty Creek and at Lateral 7. Structural work proposed for these bridges should be coordinated with Mr. J. R. Simmons, Regional Engineer, Bureau of Highways, Jackson, Tennessee.

We appreciate the opportunity to review this proposal and urge that you give appropriate consideration to the foregoing comments in finalization of the environmental statement and work plan and in implementation of the project.

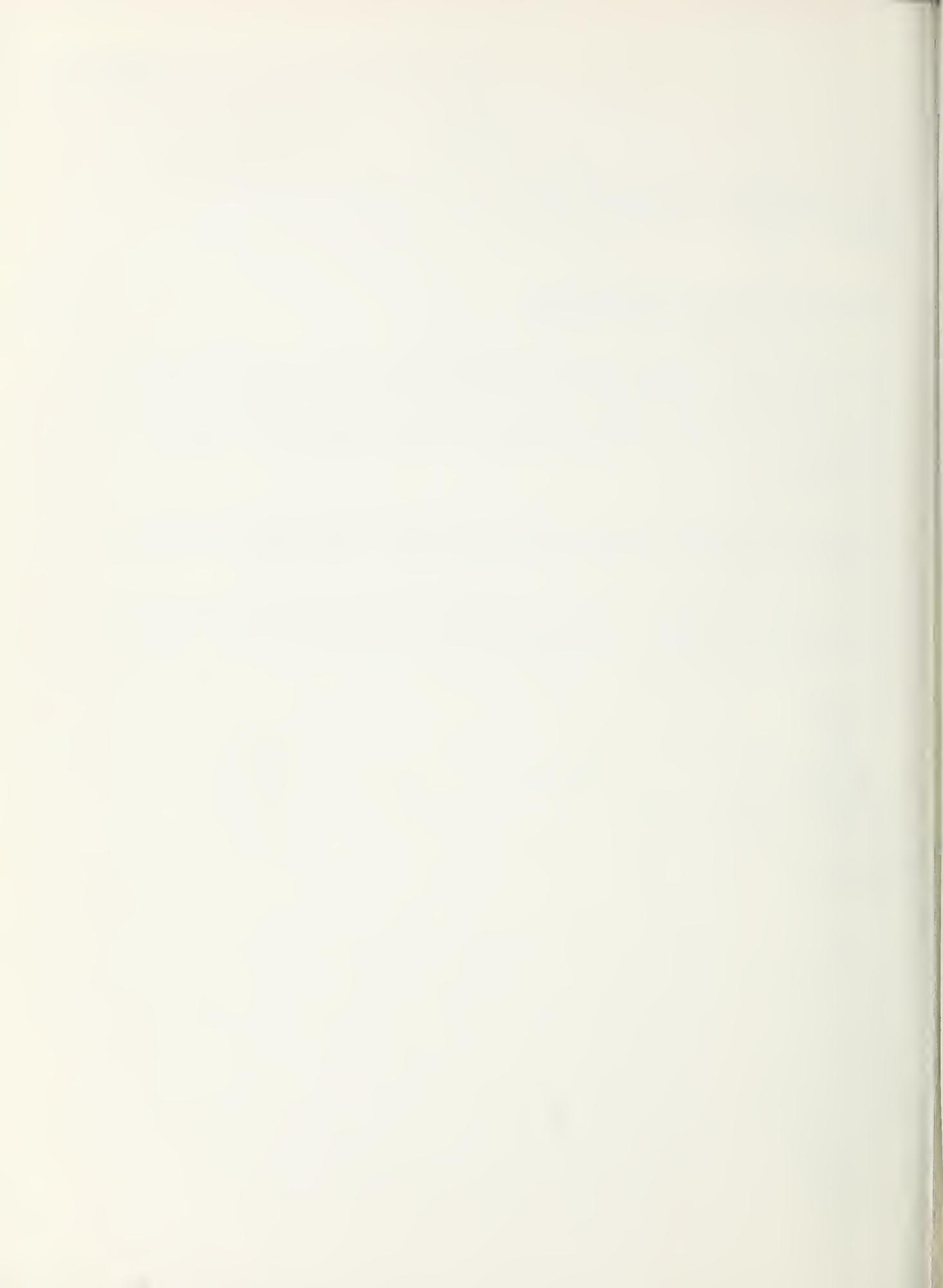
We, or other reviewing authorities, may wish to comment further at a later time. If our office, as the State Clearinghouse, can be of further assistance, please do not hesitate to contact us.

Sincerely,



Stephen H. Norris
Grant Review Coordinator

SHN: mn



CHAIRMAN

JUDGE T. W. JONES, JR.

VICE-CHAIRMAN

JUDGE THOMAS WILLIAMS

SEC.-TREASURER
JUDGE ROBERT N. GLASGOW

EXECUTIVE DIRECTOR
ROBERT W. BRANDON



POST OFFICE BOX 63
MARTIN, TENNESSEE 38237
PHONE 901 - 587-4215

August 29, 1974

Mr. Paul M. Howard
State Conservationist
U. S. Department of Agriculture
Soil Conservation Service
561 U. S. Courthouse
Nashville, Tennessee 37203

Dear Mr. Howard,

Our office is in receipt of your letter of August 7, 1974, transmitting the Watershed Work Plan for the Bogota Watershed and the Environmental Impact Statement for the Bogota Watershed.

In accordance with development district procedures, we have reviewed these documents. Our review indicates that there are no conflicts with any existing or planned activities in the area.

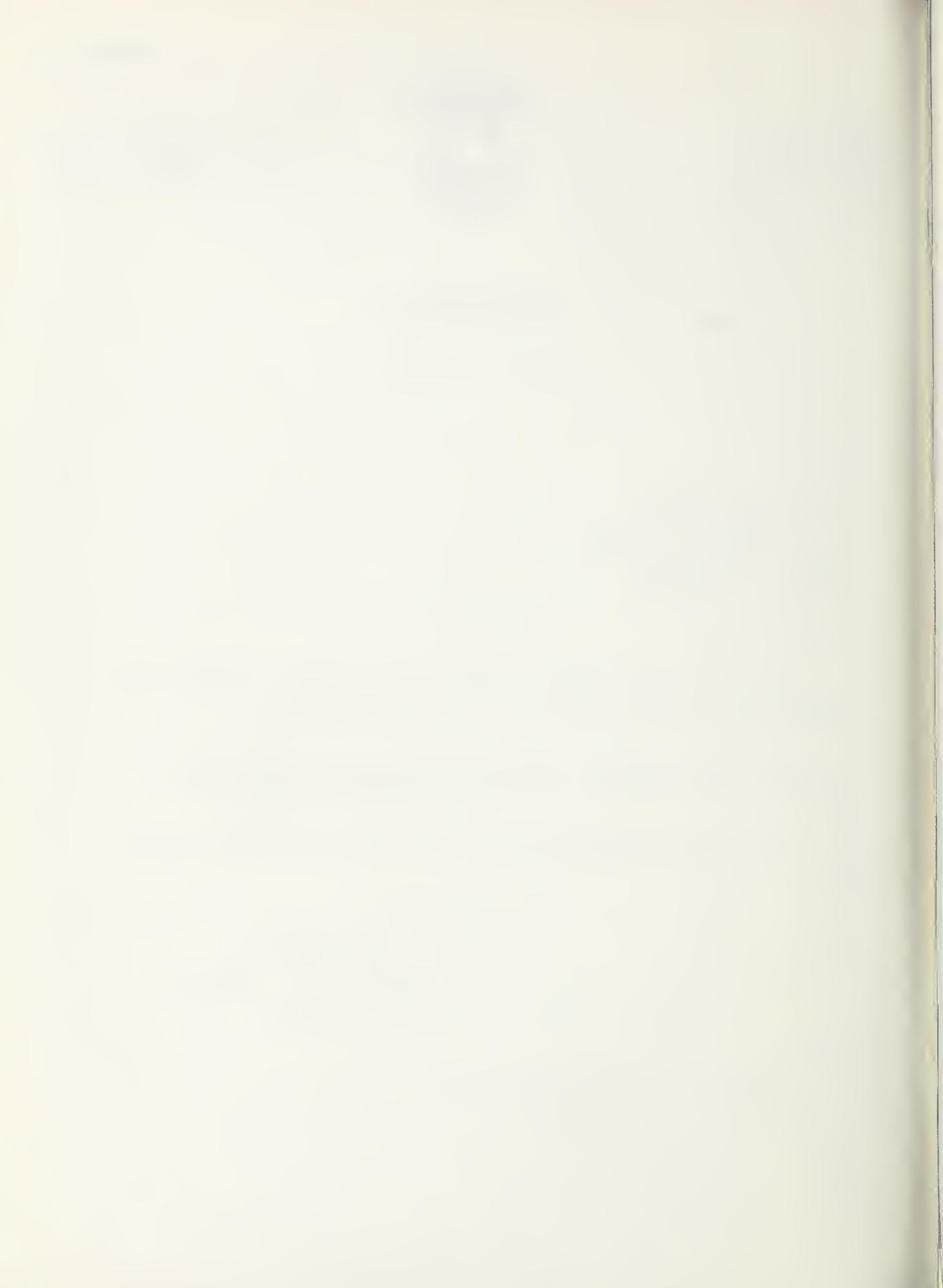
If we may be of further assistance to you in this matter, please do not hesitate to contact us.

Sincerely,

J. L. Marshall, Jr.
J. L. Marshall, Jr. (by ch)
Director of Planning

JLM/ch

cc: Office of Urban and Federal Affairs





DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

APPENDIX B

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

• 27 SEP 1974

Mr. Paul M. Howard
State Conservationist
Department of Agriculture
Soil Conservation Service
561 U.S. Courthouse
Nashville, Tennessee 37203

Dear Mr. Howard:

This is in response to your letter of 7 August 1974 addressed to Commandant, U.S. Coast Guard concerning a draft environmental impact statement for the Bogota Watershed, Dyer and Obion Counties, Tennessee.

The Department of Transportation has reviewed the material submitted. The Coast Guard commented as follows:

"Water from the Bogota watershed flows into the Obion River. The plan should discuss the impact of the project on the Obion River, which is navigable."

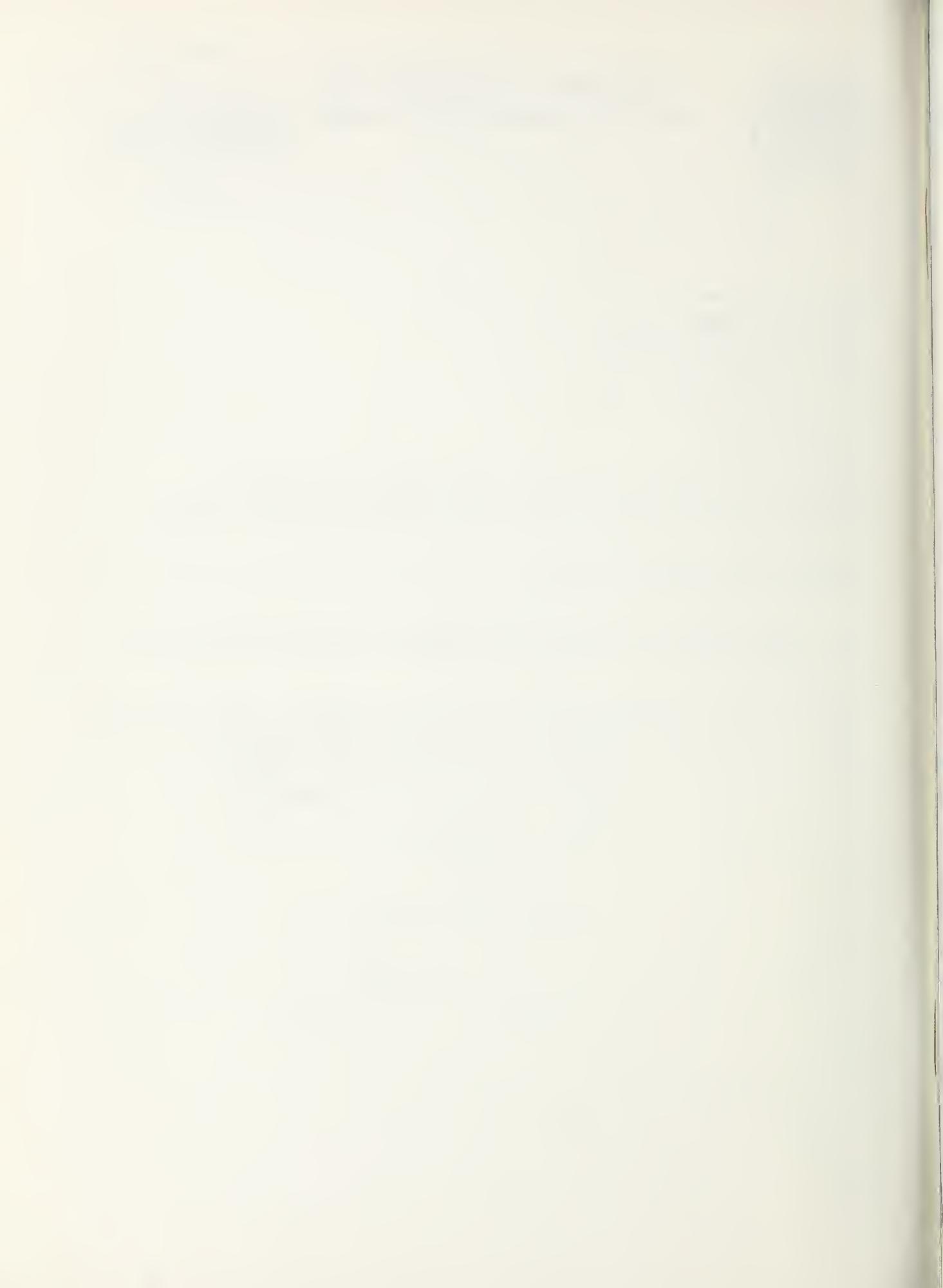
The Department of Transportation has no other comments to offer nor do we have any objection to this project. However, the concern of the Coast Guard should be addressed in the final environmental impact statement.

The opportunity to review this draft statement is appreciated.

Sincerely,

A handwritten signature in black ink, appearing to read "Price".

R. L. PRICE
Res. Adm. U.S. Coast Guard
G-WS, U.S. Coast Guard



Advisory Council
On Historic Preservation

1321 17th Street, N.W.
Washington, D.C. 20006

October 17, 1974

Mr. Paul M. Howard
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
561 U.S. Courthouse
Nashville, Tennessee 37203

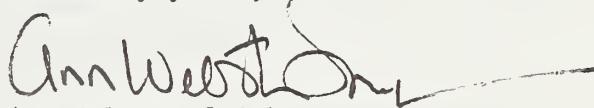
Dear Mr. Howard:

This is in response to your request of August 7, 1974, for comments on the environmental statement for the Bogata Watershed, Dyer and Obion Counties, Tennessee. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that your draft environmental statement appears procedurally adequate. However, we have the following substantive comments to make:

- a. The National Register of Historic Places is updated in the Federal Register on the first Tuesday of every month. Future statements should indicate that the Soil Conservation Service has consulted the most recent cumulative listing (Federal Register, February 19, 1974) and its monthly supplements.
- b. If available, the Advisory Council requests that it be furnished with copies of the correspondence from Mr. Stephen S. Laurence, and Dr. Gerald Smith, referred to in Appendix C, #13 of the environmental statement. Where possible environmental statements should include copies of the comments received from the State Historic Preservation Officer.

Should you have any questions or require any additional assistance, please contact Stephen Cochran at 202-254-3974 of the Advisory Council staff.

Sincerely yours,


Ann Webster Smith
Director, Office of Compliance



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

October 8, 1974

Mr. Paul M. Howard
State Conservationist
U. S. Soil Conservation Service
561 U. S. Courthouse
Nashville, Tennessee 37203

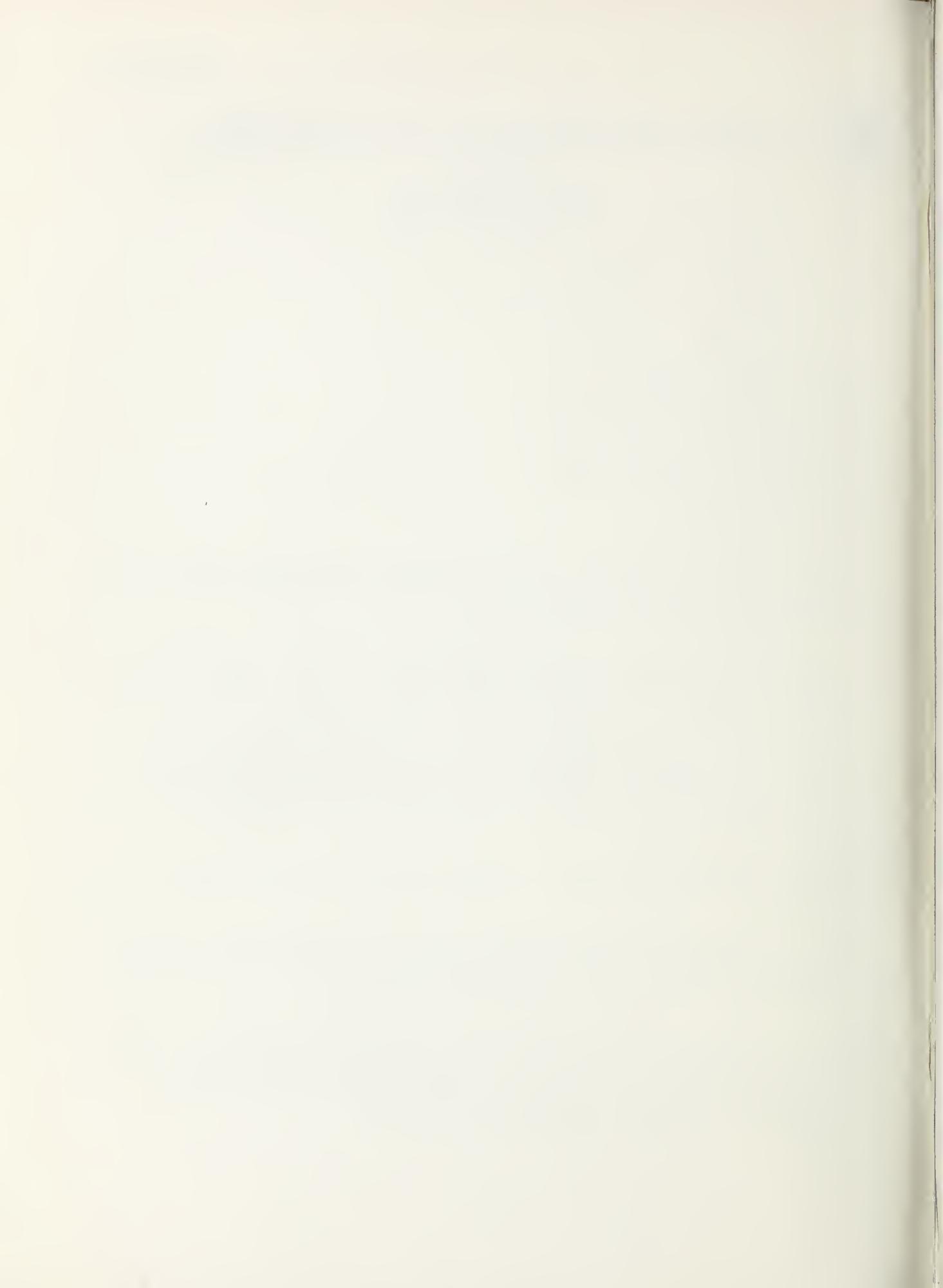
Dear Mr. Howard:

We have reviewed the Draft Environmental Impact Statement on the Bogota Watershed in Dyer and Obion Counties, Tennessee and have no objections to the action described.

We believe, however, that the Statement could be improved by a fuller discussion of the effects of the project on water quality. These effects include: (1) increase of main stream velocities, (2) increase of channel erosion, (3) greater flood peaks downstream, (4) less assimilative capacity of new channels as compared to the vegetated ditches and channels, and (5) the carrying of pollution loads farther downstream and over a greater reach of the stream before being assimilated.

In view of the foregoing, we suggest that the following points be included:

1. The main stream velocities will be increased, and, as a result, erosion within the channel will be greatly increased. This condition will continue as long as the channel is maintained.
2. The new channels will have less assimilative capacity than the vegetated ditches and channels, and agricultural and domestic pollution loads will be carried farther downstream and over a greater reach of the stream before being assimilated.



3. Flood peaks will be increased downstream. Although the Bogota Watershed by itself will not have a major effect on the Obion River, there are additional channelization projects within the Obion River Watershed which could have cumulative effects.

Since the watershed area is agricultural, the pesticides accumulated in the channel soil could possibly be released during dredging operations, and a small amount of residues released en masse could be potentially significant. We therefore recommend a sampling of existing channel bottoms to evaluate this potential problem.

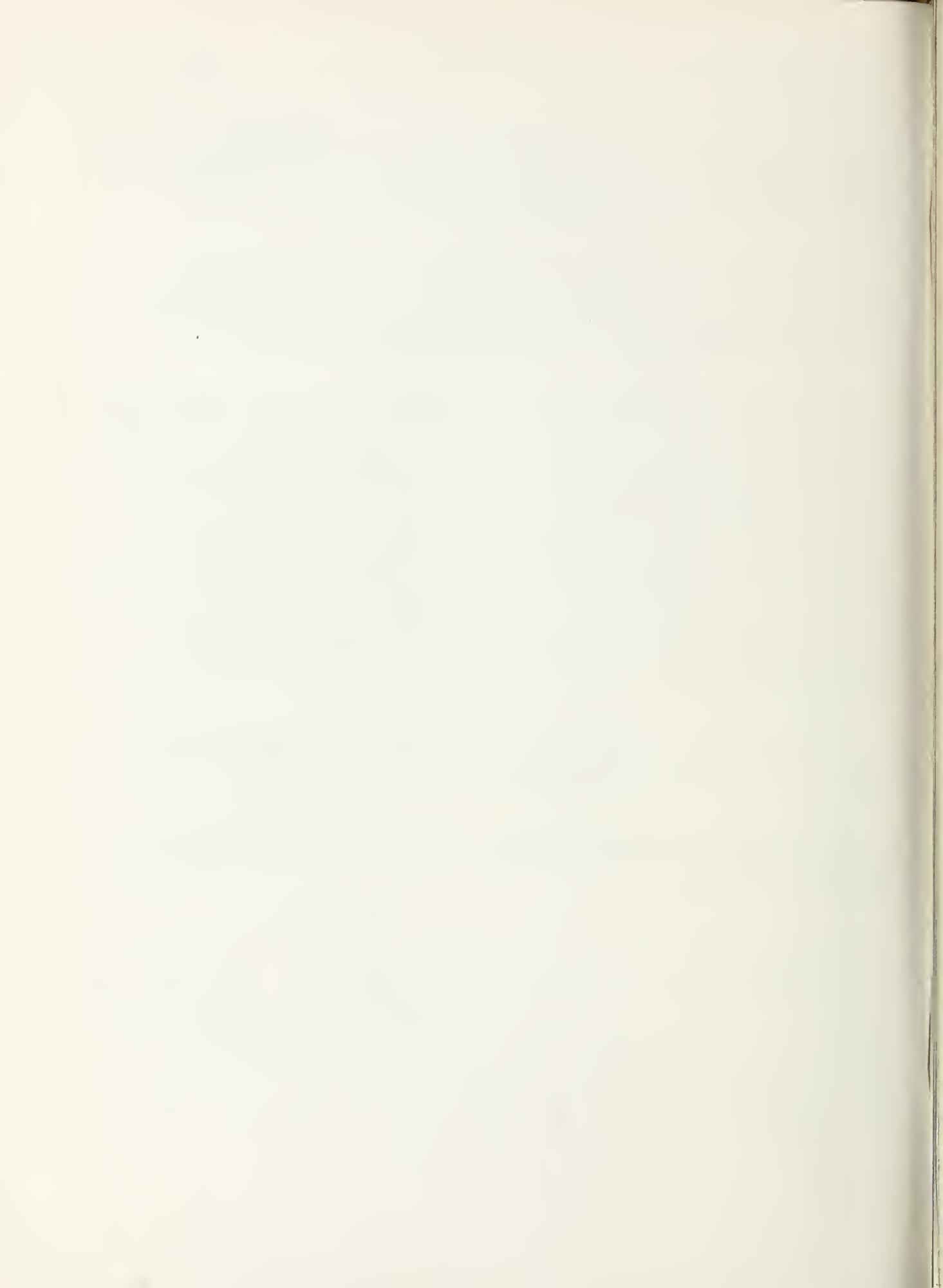
We would like to point out that if the project is to proceed, appropriate Federal permits may be needed pursuant to the Federal Water Pollution Control Acts Amendments of 1972 (FWPCA). Daugherty Creek is "waters of the United States" into which "...the discharge of any pollutant by any person shall be unlawful" under Section 301(a) FWPCA. A violation of Section 301(a) of the FWPCA will occur unless a Federal permit is obtained for the discharge of pollutants into Daugherty Creek itself. Any discharge of dredged material or of fill material that fills or blocks portions of the stream's natural channel may require a Section 404 permit from the U. S. Army Corps of Engineers. Discharges of pollutants other than dredged or fill material into Daugherty Creek may require Section 402 (NPDES) permits from the Environmental Protection Agency.

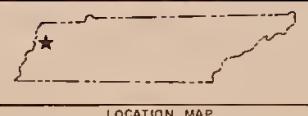
Utmost care should be taken to prevent spoil, etc., deposited on stream banks from washing or falling back into the stream since this may result in violation of Federal laws.

We would appreciate receiving five copies of the final environmental impact statement when it is available. If we can be of further assistance, please let us know.

Sincerely,

F. R. Redmond
for David R. Hopkins
Chief, EIS Branch





LOCATION MAP

89°25'

N

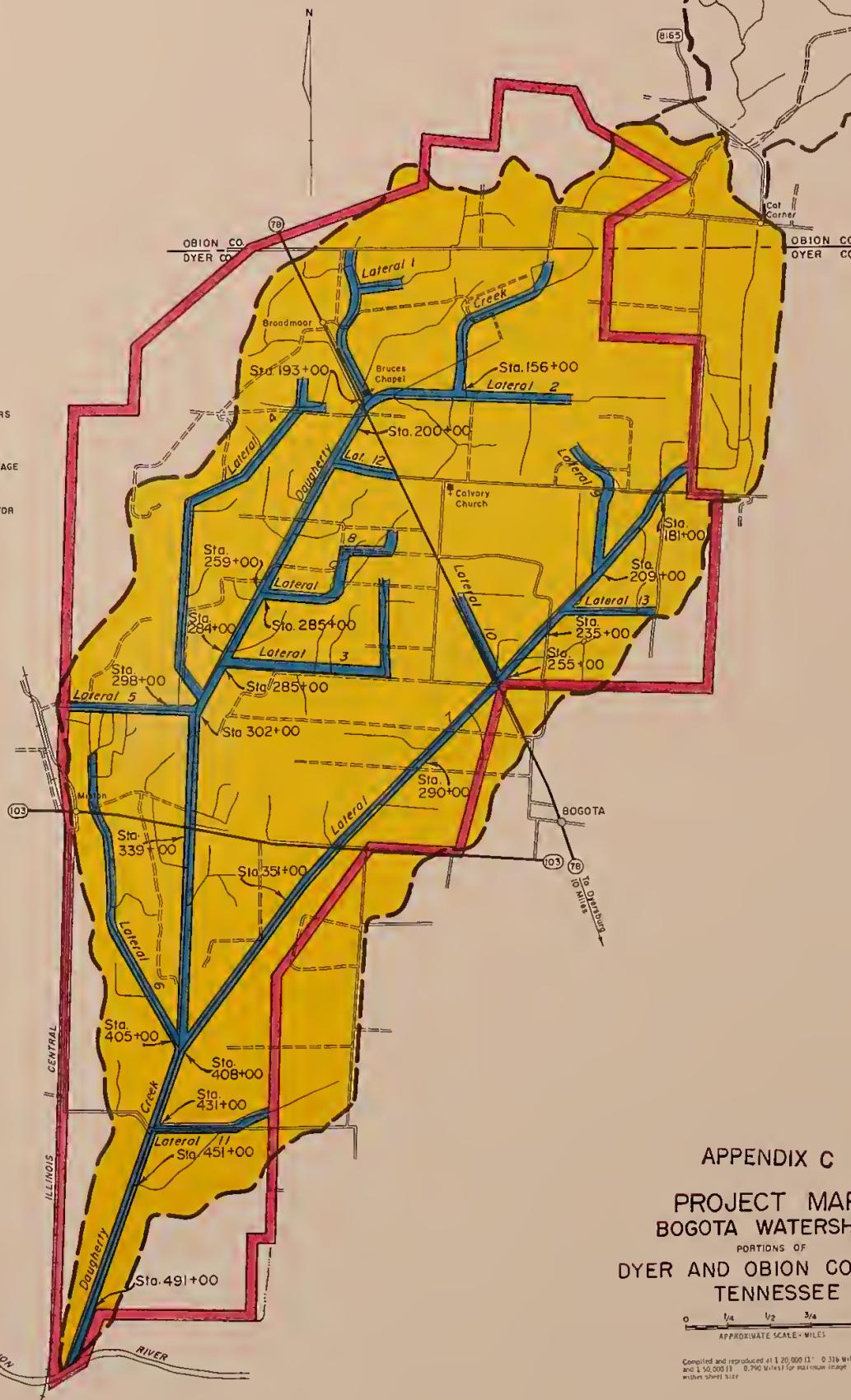
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OBION CO
DYER CO

LEGEND

- PAVED ROADS
- IMPROVED ROADS
- UNIMPROVED ROADS
- STATE HIGHWAY NUMBERS
- DRAINAGE
- WATERSHED BOUNDARY
- APPARENT BOGOTA DRAINAGE DISTRICT BOUNDARY
- BENEFITED AREA
- CHANNEL IMPROVEMENT FOR FLOOD PREVENTION

36°10'





APPENDIX D

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11. U.S. Department of Interior, Fish and Wildlife Service, 1956. Wetlands of the United States Circular 39, 67 pp.
12. Tennessee Department of Employment Security Research and Statistics Section. 1940, 1950, 1960, 1969. Tennessee Civilian Work Force Estimates.



APPENDIX D
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Lawrence, Stephen S., State Liaison Officer, Tennessee Historical Commission, letter to Paul M. Howard, State Conservationist, Soil Conservation Service.

Smith, Dr. Gerald, undated, Chucalissa Indian Museum, Memphis State University, Memphis, Tennessee, unpublished data for Obion-Forked Deer River Basin Study.

14. Lower Mississippi Region Comprehensive Study Coordinating Committee, 1973 (June), Health Aspects, Preliminary Report Lower Mississippi Region Comprehensive Study, Appendix M.





